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## EDITORIAL

Newport, Rhode Island, USA - The Editorial Staff

There's plenty of news to report starting with MIRACLE Systems announcement that the software for the QXL is near completion. Now any PC can Multi-Task, provided it has a QXL installed.

The PROGS from Belgium report that the latest versions of LINEDESIGN and DATADESIGN operate perfectly with any QL and compatible configuration. Both programs have had major improvements (new features) added as well. PD software authors will be happy to know that DATADESIGN contains a demo version of ENGINE REXT, which can be FREELY used in PD programs (the implement command is disabled).

Davide Santachiara of ERGON DEVELOPMENT, Italy reports two new software packages, the first being "ZM/128" an addition to their stable of Spectrum emulators, the ZM/128 supports emulation of Spectrum 128K machines. Their second release is titled "ERGON FLOPPY DISK UTILITIES", a package of useful tools for ALL density disk drives including HD and ED. Davide informed us that while Ergon cannot accept credit cards, they can accept Direct Bank Transfers. Send Bank Transfers to:

BANCA POPOLARE DELL' EMILIA ITALY  
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SEDE REGGIO EMILIA - CC 6533/73 - DAVIDE SANTACHIARA

Davide reminds us to include 10,000 ITL to cover bank transfer fees (the fee is the same for any currency).

Tony Firshman of TF SERVICES in the UK is shipping the long awaited Minerva 1.97 ROM upgrade. Tony also reports that Minerva MK II is now equipped with improved battery connections and a D9 connector support his new ANALOGUE and PARALLEL interfaces used with the I2C bus.

Bill Richardson of W. N. RICHARDSON & CO. (EEC) reports that he's shipping new KEYBOARD MEMBRANES. *(Editor's Note: Bill deserves the thanks of all QL'ers for single handedly restarting production of Keyboard membranes, the original stock had dwindled down to nothing.)*

MIRACLE SYSTEMS will sponsor a QL show on Saturday, the 17 July 1993 at the EUROVOLLEY CENTRE, Beneluxlaan, Vilvoorde, BRUSSELS, BELGIUM. The main attraction will be the QXL in operation. Entry to the show is FREE.

The German Post Office is undertaking a countywide change in "POST CODES" effective 1 July 1993. We've received the new codes for Jochen Merz (D-47169) and Jurgen Falkenberg (D-75236), we'll report others as they become available.

QUANTA has released three new additions disks. The new disks include DEMO\_5 and the new LIBGUIDE (now loads directly from boot). The following seven disks have been affected by either additions or upgrades:

DEMO\_3   DEMO\_4   GG\_2   GRAF\_2   MATHS\_2   PSION\_2   UG\_6

## EDITORIAL - (CONT'D)

SOFTWARE 87 of the UK, has a new software inquiry telephone number (GB) 071 285 9008. You can reach them on weekdays between the hours of 1400 to 1700 GMT.

We (IQLR) have recently installed a FAX machine. You can now reach us by either voice or fax at (USA) 401 848 3805.

Jurgen Falkenberg of Germany has sent preliminary product information on a new product entitled the "QL-IIO-CARD". Billed as an intelligent I/O card with powerful abilities for input and output. It is reported to be compatible with any QL system including the Gold-Card.

Now to the hard part (it's difficult to write about an affair you were so closely connected with) IQLR sponsored the first ever QL (only) get-together in North America on the 5th of June 1993. The affair was organized and held within a seven week time span. Even with such short notice, 60 QL'ers managed to change their schedules and attend. The average attendee traveled over 800 miles with Claude A. J. Schleyer from Albuquerque, New Mexico traveling the greatest distance (2800 miles each direction), our publisher traveled the shortest distance (2 miles).

Those attending from the UK included Stuart Honeyball of MIRACLE SYSTEMS who demonstrated the QXL card on our editor's 386DX PC. Tony Firshman of TF SERVICES demonstrated the new Minerva 1.97, HERMES (replacement for the 8049 co-processor), and his new ANALOGUE and PARALLEL interfaces for use with Minerva MK II's I2C bus. Bill Richardson of W. N. RICHARDSON & CO. was busy selling KEYBOARD-90 and HARDDISK interfaces from Jurgen Falkenberg, and was doing a brisk business with new QL Keyboard Membranes.

From Toronto CANADA came Hugh Howie who demonstrated PD software from the Toronto user group, gave away samples of the group's newsletter, and recruited new members.

Representatives from the USA included Bill Cable of WOOD & WIND COMPUTING who demonstrated his new super financial package "QLERK". Tim Swenson of "QL HACKER'S JOURNAL" fame offering disk collections of his fine publication as well as great looking T-Shirts. Frank Davis and Paul Holmgren of MECHANICAL AFFINITY and UPDATE MAGAZINE offered a complete line of QL hardware and software from the major suppliers worldwide. Frank also offered back issues of his quarterly UPDATE magazine. SeaCoast Services had Collector's Editions of IQLR and special "MIRACLE in NEWPORT" T-Shirts.

John Impellizzeri and Don Waltermann from the Detroit, Michigan area demonstrated differently configured QL systems including an assembled QL-2000 Tower Cased QL from Jurgen Falkenberg. While John and Don were not selling anything their table was quite busy.

A big part of "MIRACLE in NEWPORT" was the opportunity (many QL'ers took advantage of) to socialize and pick one-anothers brains, while gleening as much as possible from our UK visitors. Information flowed like a river at crest. On Sunday the 6th of June many of us gathered at the Pinapple Motel where Tony Firshman and Don

## EDITORIAL - (CONT'D)

Walterman demonstrated how a Bulletin Board operates using QBOX software. Stuart Honeyball was fascinated by a demonstration of RANDOM DOT STEREOGRAMS by Herb Schaaf of the CATS group. *(Editor's Note: look for Herb's RDS in this issue.)*

It's nearly impossible to name all those who attended and helped make "MIRACLE in NEWPORT" the success it was, but in particular we would like to single out three user groups who were very well represented; CATS from the Washington DC area, LIST from the New York-Long Island area, and NESQLUG from the Boston area.

Our SPECIAL THANKS go to the NESQLUG group who provided and served refreshments that made even the "Coffee Break" an event to remember.

Rather than continue on and on we'll let others write about "MIRACLE in NEWPORT". Included in this issue is a pictorial view of the get-together, hoping the old adage of a picture being worth a thousand words is true.

So many of our readers have either called or wrote expressing regrets on not being able to attend on such short notice. The response to "MIRACLE in NEWPORT" was so overwhelming that we're already talking about next year and hope to have more information available by the end of the year. At present we are looking at mid-May 1994 with the location being either INDIANA, the WASHINGTON DC area, or again in NEWPORT.

You don't need a PC  
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## MIRACLE in NEWPORT - AN ENGLISHMAN'S VIEW

London, GREAT BRITAIN - Tony Firshman (TF SERVICES)

When I heard that Bob Dyl was organising a QL event in Newport, it seemed heaven sent, as I had just given up in the infamous 'free' Hoover tickets! (*Editor's Note: Hoover had a promotion that offered free airline tickets if you purchased one of their appliances, it ended up badly.*) There also appeared to be a cut-price ticket war going on at the same time. So when Stuart Honeyball (Miracle Systems) said how about going, what other answer could I give.

We both booked with Virgin Atlantic (of course), and decided to come for five days so we could see more than just the show.

This was the first trip for both of us, and I certainly had many pre-conceived ideas about the 'states'. We were met by Dick Taylor and Bob Dyl at the International Airport in Boston, and left in the middle of rush hour traffic. Almost the first experience was the sound of a thin guy in a vast truck yelling "out of the way a\*\*\*ole" to two nice old ladies in an enormous car. We were then stuck in a noisy underground Boston traffic jam. It seemed my notions of the states were to be proved right.

**HOW WRONG I WAS.** Once we arrived in Newport, the politeness and friendliness of everyone was quite incredible. We were completely thrown by a very effusive welcome by a hotel receptionist, as if we were old friends. 'You must think we're someone else' we said dumbfounded. A very civilised and educated barman took a great deal of trouble directing us to a place to eat. Traffic stopped to wave us rare pedestrians across the road. Cars passed well over to the left while we were cycling. Cars drove slowly. The air was clean. 'Nice to hear voices from the old country' from a stranger on the train. All the (wooden) houses appeared to have acres of ground, no fences, and were very picturesque... and so on.

It was a great shock to return to the old smelly noisy rude London in a heat wave, it made me feel very glad that I'm moving out in six weeks to a more civilised Ascot. I guess New York would be something else, but we do not hear about the civilised USA we found in Newport.

We had a great holiday, and saw a great deal of Newport and the surrounding area, we even had the opportunity to visit Cape Cod (our thanks to Sherm Waterman for his guided tour). We ate plentiful and very cheaply, and drank a great deal of Bud Lite!

Oh yes - the show! Bob was clearly quite concerned that everything would happen and people would come on the day - he had nothing to worry about. He produced very professional price lists and special T-Shirts for us all, and over 55 people turned up.

Stuart Honeyball started sales of the QXL card for the PC. Software for it arrived hot from Tony Tebby in France via modem and it was quite something to see the familiar old QL mode 4 screens on Dick Taylor's modern PC. This card gives a QL with up to 8mb of ram and is at least 5 times faster than a QL with Gold Card.

Bill Richardson (EEC) who arrived a few days earlier than we did, was selling his usual range of hardware, including Faulkenberg harddisk and keyboard interfaces. Bill also announced that he had negotiated the restart of production of QL keyboard membranes.

## **M. I. N. - AN ENGLISHMAN'S VIEW - (CONT'D)**

Tony Firshman (me) using yet another machine loaned by Dick Taylor, launched version 1.97 of the Minerva ROM which now has built-in multibasic. It allows (with Hermes) split output and input baud rates for use with serial mouse (from EEC), and for the first time anywhere, we showed our analogue and parallel interfaces for use with the MK II Minerva's I2C bus. Also on display and selling well was Hermes, the working IPC that replaces the QL's bugged 8049. It allows reliable serial transfers up to 19200 bps and eliminates keybounce.

There were also traders from the states. My apologies for not mentioning them by name but we were so busy all day that I didn't have a chance to follow their dealings!

It was a very worthwhile trip in many ways, for us old country types. Both Bob and Dick spent most of their time, it seemed, ferrying us about. We will certainly visit again and cannot thank our American friends too much for their welcome.

# **PRGS**

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## REVIEW OF IMAGE PROCESSOR 2      DILWYN JONES COMPUTING

Shelby Township, Michigan, USA - John J. Impellizzeri

Image Processor 2 from Dilwyn Jones Computing is a powerful program to aid in editing or creating QL screen pictures. It includes handy and powerful utilities such as converting from one screen mode to another, removing color, changing one color to another, adding text, enhancing images, block and window handling and the ability to zoom in on and edit a specific part of a screen.

Image Processor (IP) needs a QL with at least 512K of RAM and a floppy drive. It will work with or without a Gold Card. No toolkit extras are needed, however it can use the Toolkit 2 defaults if you have TK2. IP comes with an excellent 28 page manual. This manual states that the program will work on JM, JS and Minerva 1.92 ROM's. I can report that it also works on an MG ROM and Minerva 1.97. IP is a Qliberator compiled program. The disk includes the needed runtime extensions if you don't have them loaded already, and multitasks well. All functions can be accessed from the keyboard, although a joystick or mouse can be used.

IP has a built in help facility to assist the user. Just press F1 and up pops a help screen with text pertaining to the function you just selected. This works similar to the help in the Psion software; if you ask for help at the main menu, it offers a list of the available functions, if you ask for help after selecting a function it gives specific assistance for that function. The help is also configurable. As delivered, whenever you select an item from the menu, a help screen will appear to guide you. This is handy when you are first learning the program. Once you are familiar with the program, this gets annoying and slows you down, so IP allows you to turn off this automatic help. Help is still available if you need it. While this online assistance is great, it doesn't replace the manual. I would still recommend reading the manual to get a feel for all IP can do.

I mentioned that the help was configurable. Many parts of IP are configurable. After you've used the program awhile and find your always changing IP's built in defaults, you can configure the program so it starts up just the way you want it.

A very nice part of IP is that if you use any function that would permanently alter the screen, the change is made on a temporary basis and you are given the chance to see how it looks and a choice to keep it or go back to what you had. This is very good in case you make an 'oops'. It's still a wise idea to save your work in progress regularly and maybe keep a few older versions just in case.

Memory permitting, you can have up to 9 screens loaded at once and can easily switch between them. IP allows you to copy screens, merge them, or do cut & paste type block moves between screens.

All of IP's functions can be used in either of the QL's screen modes. IP can also convert a screen from one mode to the other. Depending on the picture this sometimes looks OK and sometimes it doesn't. However with all of the editing functions available it can be made to look reasonable if you have to have a screen in a specific mode. IP also lets you switch the screen mode without changing the picture. There is an Unflash function to tidy things up if you load a mode 4 screen with the QL in mode 8. The program can save and load standard QL screen files. In addition, it can save and load compressed screens in its own format and one compatible with The Painter and The Clipart programs from PROGS. It can also load compressed screens from Digital Precision's Eye-Q.



## IMAGE PROCESSOR 2 - (CONT'D)

No screen image utility would be complete without text and graphics drawing facilities. IP has both, allowing many types of graphic shapes such as circles, rectangles, arcs, polygons and lines to be 'drawn' on the screen, moved around, and sizes & colors changed. Shapes can be filled with a color, and there is a paint brush option with an adjustable size brush to paint an area free hand. A 'spray' function is also available to tone an area with a color similar to using an airbrush. You can specify the size of the area, the color, and the density. Text can be added anywhere. Many options exist for text. Various sizes, ink and paper colors, and fonts can be used. IP comes with 22 fonts on disk and it can use almost any standard QL font from other packages like Lightning or desktop publishing programs. A handy feature is the ability to specify the OVER value. This works like the OVER function in SuperBASIC. It determines whether text entered will be placed using the ink and paper colors, or superimposed or blended in to the image. Experimentation is best here to see the different effects, and this is easy and painless with IP's confirmation option.

I've left a few of IP's most powerful functions for last. Enhance will attempt to clean up any graininess or random dots in a picture. The manual states that it is best used on a digitized picture to clean up any noise signals introduced during the digitization. It also says it is not too effective on hand drawn, dark, or smoothly colored pictures. Like most of the other functions it has an undo option so experimentation is worth a try. If the result doesn't please you it's easy to undo. Outline will generate a white on black cartoon-like outline of a picture. It works best if there are only solid colors in the picture. Stippled colors can confuse it. Since it also has an undo option, it won't hurt to try it and if it doesn't give the results you want, you can always undo it and re-edit the picture and try again. Both enhance and outline work quite fast considering what they accomplish. The content of the picture does seem to have an affect on the speed, but each function took less than 20 seconds to do the whole screen on a Gold Card machine.

IP has a windowing facility. This lets you process only a portion of a screen leaving the rest of it untouched. The size of the window is adjustable from practically pixel size up to the size of the screen. Almost all of IP's functions are available in this facility in addition to a few new ones. You can decolor, recolor, outline, enhance, mirror the image vertically or horizontally, pan and scroll and invert black and white. All of these also have an undo option.

The zoom and edit function lets you zero in on a section of the screen and edit it on a larger scale. Each pixel is blown up to 4 times its normal size. You can then set individual pixels in any color or draw pixel sized lines in any color. While in this mode you can pan and scroll to other parts of the screen. This makes working on detailed parts of the picture much easier. As usual there is an undo option.

Finally, once you have your masterpiece completed, it can be saved so that it can be used in another program or you can print it directly to a printer if desired. IP has support for three types of printers plus a facility to use your own external printer driver. Details for writing a custom driver are supplied. IP can print to Epson compatible 9 and 24 pin printers and a Hewlett Packard Deskjet 500. The HP driver works in HP mode so you don't need to use an emulation cartridge. There are options to each type of printer. You can specify a mono or shaded printout and you have the option of inverting black and

## IMAGE PROCESSOR 2 - (CONT'D)

white for printing. The Epson type options also let you specify the number of passes of the printhead per line. The built in drivers are configurable as far as the codes required by your printer to tell it what type of graphic printing to do.

Image Processor 2 is a very powerful, easy to use program to handle QL screen pictures. It has a wide range of features and is very user friendly. Buy it.

*(Editor's Note: IMAGE PROCESSOR 2 can be obtained directly from DJC (please see Dilwyn's adverts in this issue) or from any QL dealer worldwide who carries DJC software.)*

## NEWS FROM DILWYN JONES COMPUTING

DJC has extended its already wide range of QL software by reaching agreement with some of the authors of the commercial software formerly published by CGH Services (CGH stopped trading at the end of March 1993). The following seven programs have been re-launched by DJC: SQUIDGY ROUND THE WORLD, OPEN GOLF, GREY WOLF, QUICK MANDELROT III, STQL, QUIZ MASTER II and 5 GAME PAC.

In addition to the above DJC has launched a much asked-for utility program to print wide spreadsheets and text files sideways in landscape print on 9 and 24 pin dot matrix printers. The program is titled SIDEWRITER and the cost is a mere £15.

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# plus4

## QL Wordprocessing at its Best

### IMPROVING YOUR PRINTING: Option 1

New printers using twenty-four pin, bubblejet, inkjet or laser technologies offer very fast output of the highest quality. They feature multiple proportionally spaced founts in different sizes. They allow precision adjustment of spacing between words and between lines.

On the QL, only plus4 with its dedicated printer drivers is capable of utilising these advanced features. We mean utilising, not playing with. We mean the ability to calculate automatically the number of words that fit within the margins, justifying with proportionally spaced founts as well as typewriter style fixed pitch. And the facility to vary line-spacing in different parts of the text with automatic calculation of page breaks. Plus page layouts with multiple columns, with equal or unequal widths.

plus4 and its printer drivers put all these features at you fingertips. Select the appropriate driver once and forget about control codes, translation of accented characters, counting the lines to fit the page, calculating the number of characters that fit within the margins—all the tedium that is part and parcel of wordprocessing with other programs.

### IMPROVING YOUR PRINTING: Option 2

You may already own a 9 pin dot-matrix or daisy-wheel printer. Upgrade it with plus4! We have written forty dedicated printer drivers for those old favourites. Although not in the same league as far as output quality and speed are concerned, they share some of the features of modern printers. plus4 brings out the best those printers are capable of.

### IMPROVING YOUR PRINTING: Option 3

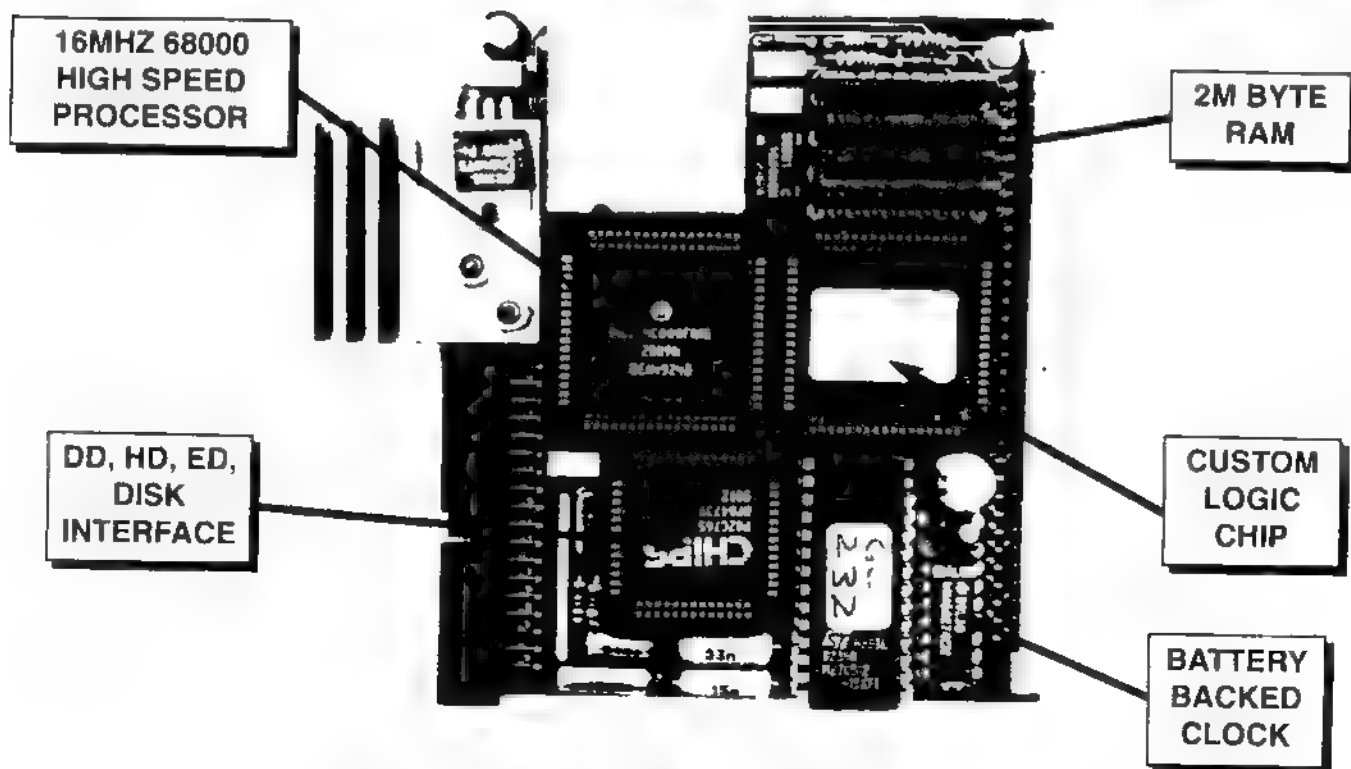
plus4 drivers mentioned so far are text-mode drivers which print at the fastest possible speed: up to several pages per minute with fast printers. We were not talking about graphic mode printing which is not of the same quality and is hampered by the serial port bottleneck (it can take several minutes per page even with the Gold Card). Nonetheless, we also offer plus4 users a graphic mode driver for dot-matrix printers: founttext88. Up to 32 bit-mapped founts can be loaded with founttext88 and used freely in your texts. It typically takes less than 4 minutes to print a full page which is very fast by QL standards. founttext88 allows you to modify the founts or design your own.

plus4 requires disk drive and 256 K memory. Leaflet with list of supported printers available on request.

text87plus4	£79
2488 (drivers required for 24-pin and bubblejets)	£19
typeset90-deskjet (drivers required for all HP Deskjets)	£19
typeset90-Epson (drivers required for Epson Lasers)	£39
founttext88 + founted89 (optional dot-matrix graphic driver)	£39

Software87, 33 Savernake Road, London NW3 2JU

# MIRACLE SYSTEMS



## QL GOLD CARD

**£225 inc. (£200 outside EC)**

This is the expansion that has been revolutionising the QL. It is very easy to fit - it simply plugs into the expansion port at the left hand of the QL - and once fitted it will instantly increase the execution speed of the QL by about 4 times due to the presence of a 16MHz 68000 on board. There is 2M of fast 16 bit RAM of which QDOS sees a contiguous 1920K. The remainder is used for shadowing the QL's ROM and display memory and for the GOLD CARD's own code.

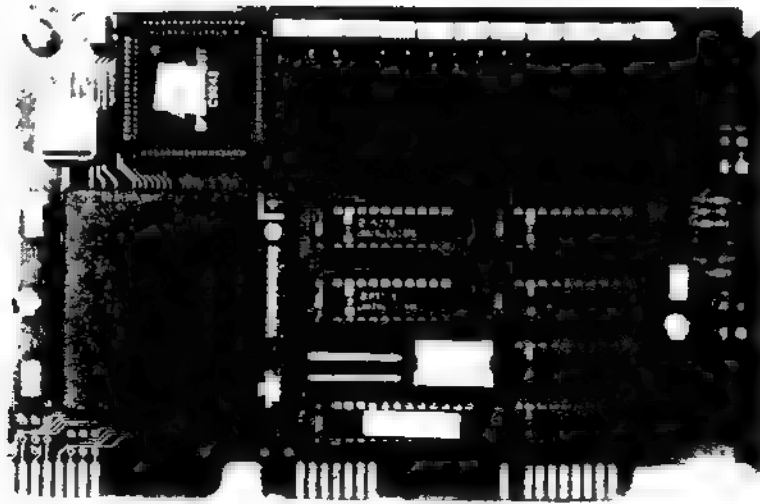
There is a disk interface which can access 3 mechanisms (4 with the DISK ADAPTER) of 3 different densities. DD (double density, 720K), HD (high density 1.44M) and ED (extra high density, 3.2M) in any mix. The disk interface connector is the same type that was fitted to the TRUMP CARD so most QL compatible disk drives can be used. Please note that DD drives still give a capacity of 720K per diskette. Our DUAL ED DISK DRIVE allows the GOLD CARD to access DD, HD and ED diskettes.

Another feature is the battery backed clock. When the QL is switched on the contents of the clock are copied into the QL's clock so that the time and date are correct. The firmware in the ROM gives the GOLD CARD all the functionality of the TRUMP CARD like TOOLKIT II and there is a sub-directory system for floppy and RAM disks.

Physically the GOLD CARD is about half the size of the TRUMP CARD and so fits almost all within the QL. Its current consumption is well under the allowable maximum so no special power supply is required. The GOLD CARD comes with a 14 day money back guarantee and a 2 year warranty.

# MIRACLE

## THE QXL



The QXL turns the common PC into a QL compatible. The package comprises a half card that plugs into an 8 or 16 bit standard ISA slot and a diskette loaded with a QDOS compatible operating system and a Superbasic compatible interpreter. After installation simply type QXL and the PC will appear to be a QL allowing QL programs to be run from QL format diskettes.

The card itself has a 32 bit 68EC040 processor running at 20MHz which gives a good turn of speed. This processor has access to its own RAM and so performance is virtually independent of the host PC whether it has an 8088 or a Pentium. In fact the PC is used purely as an I/O system giving QL programs access to the PC's floppy disc, hard disc, keyboard, display, serial and parallel ports. The card itself has QL style network ports to allow connection to a QL network. The minimum PC specification required is an XT with EGA display and a spare standard slot.

Varying RAM sizes from 1M up to 8M can be supplied. The smaller capacities can be upgraded to the larger ones and the cost is simply the price difference. Not all the RAM is available to the user programs; the 1M equates roughly with a TRUMP CARD QL memory size and the 2M with a GOLD CARD QL.

During the lifetime of the QXL we intend to enhance the software to make use of the new hardware facilities of the PC such as SVGA graphics. As has been our policy with the TRUMP CARD and GOLD CARD we intend to provide software upgrades free of charge.

# SYSTEMS

## QXL prices

<b>1M</b>	<b>£295</b>	<b>(£255)</b>
<b>2M</b>	<b>£325</b>	<b>(£280)</b>
<b>5M</b>	<b>£410</b>	<b>(£355)</b>
<b>8M</b>	<b>£495</b>	<b>(£430)</b>

(prices in brackets for outside EC)

### **QL SHOW SPONSORED BY MIRACLE SYSTEMS**

**See the QXL at the Eurovolley Centre,  
Beneluxlaan, Vilvoorde, Brussels, Belgium  
on Saturday 17 July 1993. Entry Free.**

**INTERNATIONAL QL REPORT (IQLR)** is a regular magazine that all QL users should read. It has articles for the beginner, the advanced user and every one else in between. Also, the international flavour combined with low advertising rates makes it probably the best place to locate QL related items. IQLR is run by QL enthusiasts whose proud boast is that they have never been late with an issue. If you do not already get it then 'phone us now. One year's subscription for 6 issues to any European address is £22.00 and it's worth every penny. Subscribers elsewhere should contact SeaCoast Services, 15 Kilburn Court, Newport, RI 02840, U.S.A. direct.



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# Ergon Development June 1993 price list

**Davide Santachiara, Via Emilio De Marchi 2, 42100 Reggio Emilia, Italy**

All the prices are given in ITL (Italian Lira). To send a foreign currency cheque use current conversion rates (eg 1.000 ITL=0.44\$=1.0\$ DM=0.63\$ - ask your bank as these values may change) but remember to add 10.000 ITL to cover our bank conversion charges.

**ZM/x system plus-2** Spectrum 48k emulator. This package comprises ZM/2, ZM/3, BACKUPPERS, ZM/ACCESSORIES (ZM/DISK UTILITIES + ZM/DIGINET) and ZM/CONFIGURATOR. ZM/2 & ZM/3 are sold together as they are complementary. ZM/2 is an emulator and is the most compatible while ZM/3 is a threaded code compiler so ZX games run faster. Specifications: Fast emulation (ZM/3, 50/80% ZX speed on a Gold Card), Smooth sprites movement, True ZX sound through network port, >99% Compatibility on ZM/2 (over 300 games tested), Interface 1 emulation (on ZM/2). The supervisor offers you True ZXQL tapefiles managing, Z80 Monitor facilities, Z80 snapshot load/save and a lot more. The price comprises one 3.5" disk, 46 pages manual, ZM/2, ZM/3, ZX & QL programs to transfer your ZX programs into the QL via net or ser port (BACKUPPERS - QL <-> ZX IF-1 serial cable is available for 20000 ITL), conversion utilities for Plus D, Diskette or Opus Discovery disks (ZM/DISK UTILITIES) and a utility to read and convert directly ZX tapes from the network port (ZM/DIGINET v3 works on any QL hardware with fast ram: GC/TC/Expanderam). The ZM/x system costs 60000 ITL.

**ZM/hT system:** Advanced Spectrum 48k emulator. The ZM/hT system comprises the full ZM/x system (as explained before) plus the new Z80 compiler ZM/hT (high technology). ZM/hT converts dynamically Z80 code into fast 68000 machine code! It offers you many options to optimise the code produced (speed, compatibility, screen redrawing smoothness...). With ZM/hT you can play games on a 16 MHz Gold Card at a speed very similar to a real Spectrum (70% to 130%). Amazingly compatibility is now >99%, like ZM/2. ZM/hT now works even on 640 Kb QL or Trump-Card QL with interesting speed results (30/50% with some games). "... really spectacular ... Ergon have made a highly professional product, well worth the price" ICLR Vol 3 n.1 - "ZM/hT is fast ... well worth the extra cost... an incredible feat of computer science" Simon Goodwin QLWorld 4/93. The ZM/hT system (ZM/2,3,hT + utilities) costs 90000 ITL.

**NEW ZM/128:** Spectrum 48k / 128k emulator. New supervisor (similar to ZM/hT). It supports Interface 1 emulation, joystick emulation, and the new Z80 v2.0 48k/128k snapshot format. Disciple 128k Snapshot converter included. Amazingly speed in 128k mode is similar (though slightly slower) than in 48k mode thanks to a very clever 16k memory bank switching implementation. FOR=1 TO 200 PRINT 1, NEXT 1 is performed in 13s on a Gold Card. ZM/128 can be bought in addition with ZM/x or ZM/hT system for an additional 20000 ITL.

**NEW Ergon Floppy disk utilities** It comprises many useful tools for Double Density (720 Kb), High Density (1.44 Mb) and Extra Density (3.2 Mb) QL or alien disks. You get: 1) a fast and powerful DISK EDITOR with many functions: Search, Edit, Collect, Recover corrupted files (even if the directory and/or sector map is corrupted); 2) An Intelligent disk copier/verifier which can work even with a single disk drive system (single or multiple copies are allowed); 3) Much more. Ergon FLP disk utilities costs only 35000 ITL!!!

**MasterBasic plus-1** The Ultimate tool for the SuperBasic programmer. It allows you to speed-up drastically the construction/debugging of your programs. Search and reference any variable, tokens combination, string, FOR and SELECT loop, procedure, function on the whole program or only inside selected routines, join lines, view return stack... You see in a pop-up "Line Menu" all the referenced lines and the number of occurrences in each line. Then you can edit or list the desired lines with a simple keypress. MasterBasic is fully compatible with Minerva integer tokens and MultiBasics. Now configurable with auto-sleep option under PE. MasterBasic costs 45.000 ITL with >30 pages manual. *The package is extremely easy to use and well thought out, and even the more casual SuperBasic programmer should get a lot of use out of it* QLWorld 6/92 - "Elegant and useful" Simon Goodwin QLWorld 4/93

**QLibrary Manager:** Not a simple library manager but a clever SuperBasic source code extractor/manipulator. Do you need a routine from a SuperBasic program written some time ago? QLM will extract it for you, just tell him what you need. Very powerful and professional. QLM costs 40.000 ITL with >20 pages manual. *Overall the package is useful for SB authors and should enable new Basic programs to be created quickly, using experience and routines already created for earlier programs...* QLWorld 8/91

**DEAssembler v5 NEW plus-2** DEA is the cheapest but also the most powerful INTELLIGENT disassembler for the QL. Just load the desired file and DEA will do all the work. It usually disassembles >95% of any program without user intervention, saving you HOURS of manual work! It can extract AUTOMATICALLY Toolkit commands ready to be re-assembled. Multi data-types are recognised with automatic selection, providing auto-recognition of SB extensions, ROM headers, strings, QDOS, SMS, PE, WMAN calls, Config tables and Things extensions. DEA has knowledge of the structure of parameters passed to the most important o/s calls. This improves the degree of automatic decoding, and makes generated source code quality and readability really impressive. Calls to the o/s (QDOS, SMS, PE...) and error/system basic variables keys are reported (with QDOS or SMS notation). The output is 100% compatible with GST/QLMAC, METACOMCO, HISOFT assemblers. DEA costs 55.000 ITL with >35 pages manual. QL World 4/92 said about version 4: *This program is certainly the most versatile machine code programming utility I have seen on any computer to date*.

**Open World:** (V2.1) Graphic conversion utilities. Load into the QL GIF files (present in enormous quantity in all of the SBS), TIF (scanners), IFF (Amiga) or CUT images of any dimension. Convert them into 4/8 colours (grey levels) or monochrome QL images (with a powerful dithering algorithm - great for DTP applications). Open World costs 35.000 ITL and is supplied on two disks with some beautiful images, a QL to PC screen converter (file saved as GIF) and a program to read QL disks on MS-DOS v5, SUN, VAX, UNIX...

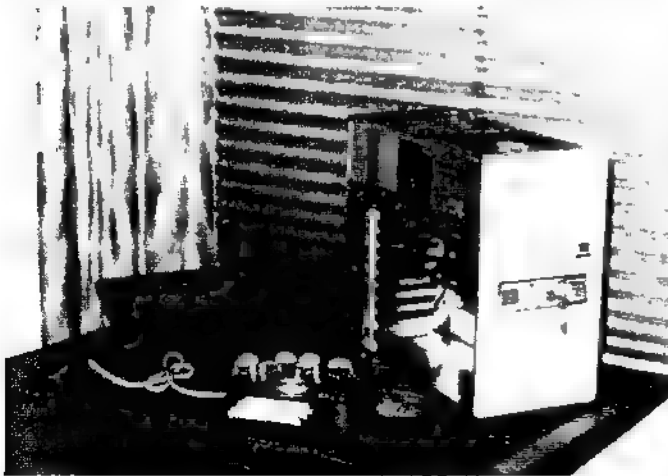
**MusicManager:** (V1.2) Simple program to create and play music on the QL. Psion style operation. It costs only 20.000 ITL with 8 pages manual. *"If you want to produce something of a semblance of music on the QL, then this is a useful package"* QLWorld 6/91

Please add 12.000 ITL for airmail postage (Europe) & packaging (25.000 ITL airmail p&p outside Europe). Acceptable forms of payment are: Eurocheque in ITL, Postal order in ITL (send a copy of the receipt), Foreign currency cheque (ie. not in ITL). Please add 10.000 ITL for bank fees. Cheque payable to Davide Santachiara. Direct bank transfer to: Banco Popolare Dell'Emilia SWIFT BPMOIT22 Sede Reggio E. CC. 6533/73 D. Santachiara (add bank fees even if sending ITL). Discounts: 5.000 ITL off for any 2 prags, 10.000 ITL off for 3, 15.000 ITL off for 4 and so on. To receive our disk with PD or demo version of our programs send 6 IRCs. This disk is really worth having. It contains over 1.5Mb of data in compressed form! All of our programs (except MusicManager) need 512Kb expansion and are based on our powerful Menu System II: a QPac 2 style menu system. They are compatible with Minerva and the P.E. They are written with clear English messages and the manuals have been improved in the UK. When ordering please state your configuration.

## QL-2000 TOWER CASE QL DIY-KIT

Troy, Michigan, USA - John J. Impellizzeri & Don Waltermann

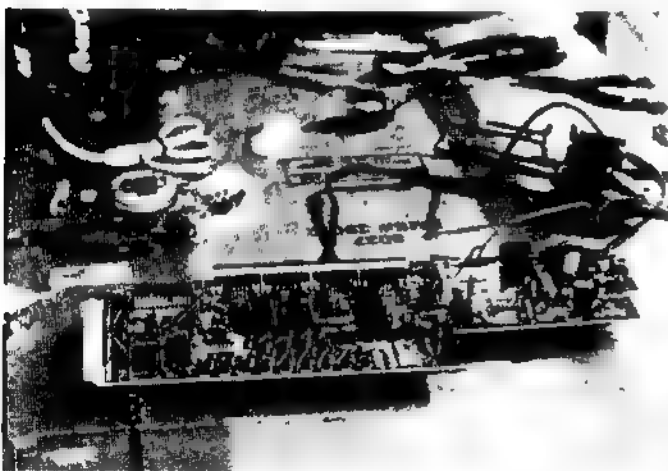
This kit is from Computer Technik/Jürgen Falkenberg in Germany and lets you move your QL into a modern mini-tower case. You gain many advantages from this move: disk drives in the same cabinet as the computer, room for expansion cards in the same case, stable power supply, one power switch for the system, smaller footprint and more modern appearance. There is clearance for a ROM cartridge to be installed, although you have to partially disassemble the PC case to install or remove it. The kit requires some serious work on your part. The manual estimates 4 hours for installation. We found 12 hours to be more accurate at least the first time around.



*(QL with Tower Case and supplied parts)*

Be prepared to do some serious soldering. While the instructions provided basic details for mechanical mounting of the QL components, some ingenuity will be helpful in a successful installation. For example, the basic kit provides two standoffs to mount the main board. (These are the two original mounting holes). While this does work, it means everytime a chip is replaced or a new option is added, the board will flex. We added 7 additional standoffs (nylon spacers) underneath the main board. They were not attached to the main board but just provided some support under the socketed chips.

We also decided to add some improvements along the way. This makes sense since you have the QL completely disassembled anyway. You might consider purchasing a spare QL motherboard. Whole QLs are available in the U.S. for \$35. This allows you to spend time modifying the motherboard properly without preventing you from using your system (it also provides you with a little safety margin in case you miswire the power connections). We added the Tom Bent modifications. (If you haven't heard of these



*(modified QL motherboard)*

modifications and are interested contact IQLR). The power supply fixes were not implemented as they are a moot point with the new 200 watt supply in the mini-tower case. The instructions for converting the power supply to drive the QL are good except that the wire colors supplied didn't completely match the directions. The directions were also vague about where to mount the QL's original heat sink. A drawing would have helped. We chose to mount it to the bottom mounting lug of the power supply. This caused problems later on when two floppy drives were replaced with a 40 MByte hard disk. The hard disk was deeper

## QL-2000 KIT - (CONT'D)

than the floppies it replaced. The power connector on the hard disk ran into the heat sink. If we had known this in advance, we would have mounted the heat sink elsewhere. Since the cables were already cut to length, we used a different shaped heat sink to get some clearance.

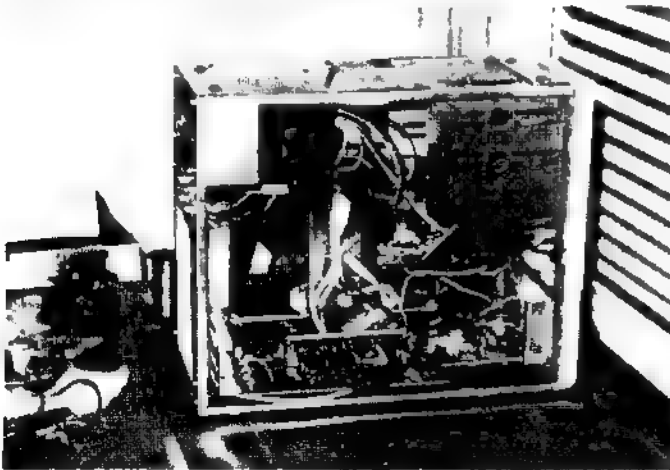
The main problem area was the Bus-Expander. This is a 'flip-over' card that puts your QL expansion bus cards upside-down over the QL itself. Pay attention to the instructions on page 3. The Bus-Expander must be connected before installing the QL main board in the case. There is not enough clearance to install the expander after the QL is mounted in the case. The board works fine but has some serious mounting and stability problems. No means is provided to anchor the expander to the QL or the expansion cards to the expander. Also the expander backplane is within 1/4 inch of bare sheet metal of the case. The manual recommends using some scotch tape but we didn't find that an adequate solution. What's needed is something insulated to keep the expander board from shorting against the metal case and also to keep the board firmly seated in to the QL. Once you get the expander board seated and insulated you are still left with the problem of keeping any expansion cards plugged into the board securely. Since they hang upside down over the QL motherboard with no support any vibration could dislodge the board (with a hard disk you will have some vibration). One possible solution is to tie wrap the DIN connectors together. Each connector has a mounting hole on each end. These can be tie-wrapped to the corresponding hole in the backplanes' DIN connector. That would prevent the boards from working loose from the backplane as well as provide some stability. You have to be careful that any expansion boards don't contact any modifications such as caps, EPROM boards, QIMI etc, that may be installed on the QL. Often these add-ons assume this space is vacant. We haven't come up with a good solution yet but this does need to be addressed. We tried using the Bus-Expander with the flexible ribbon cable. This can be mounted to the back of the case using standoffs. This eliminates the chance of shorting out and makes the backplane stable. However, my Gold Card did not work reliably off this backplane (other boards like the Cumana disk interface, JFC hard disk interface and Miracle expanderam worked). It appears to be a seating problem since I can get the Gold Card to work by flexing the connection on the backplane (this Gold Card is 100% reliable when plugged into a standard QL). A little more experimenting is needed here.

Another potential problem area is the video extension cable. The DIN 8 connector makes a hard right angle bend as it exits the QL board. It works fine but it is a very tight fit. In addition to extra parts listed in the kit instructions, you should add shrink wrap, heat sink compound, RS-232 standoffs and small hardware to your parts list. Some of the supplied hardware just did not fit well but that could be the fault of the case manufacturer. However, the supplied adapter to mount the DB9 connector for the joysticks doesn't fit well in the DB25 cutout. Standard adapters are available for this application. (JDR Microdevices supplies a PC bracket with 2 DB9 cutouts for \$1.95 each part number BKT-14. JDR has no minimum order requirements.) We also added an extension cable for the JFC Keyboard 90 interface (another very tight fit).

We had one defective part to troubleshoot. Some of the coax supplied to extend the network ports to the back of the case was defective. It probably was broken during installation of the network ports in the rear panel. The ports are located very close together making installation difficult.

## QL-2000 KIT - (CONT'D)

The new QL-2000 was tested with a Gold Card installed. It worked just as well as a Gold Card on a standard QL. Now that you have the QL installed in the new case, adding any extras like Qimi, Minerva or JFC Keyboard is much easier since there is more room and better access to everything.



*(completed QL-2000 DIY-KIT)*

The kit does not provide for mounting the microdrives. The instructions describe them being available as an optional extra. It also does not provide a cutout for the Qimi mouse. You can sacrifice a joystick port if you choose or you could use a standard PC expansion card plate and mount a connector there (JDR part number BKT-12 bracket with 1 DB9 cutout).

This kit was fun to assemble and produced a much cleaner QL package. If you are willing to spend some time, do a lot of soldering and a little problem solving, this is a very

rewarding project. The case now holds 2 floppies, a 40 MByte hard disk, JFC keyboard interface, JFC hard disk interface, Gold Card, Minerva Mark II and power supply. Try to put all that in the original QL! If you are interested in the kit but don't want to spend the time or don't like to solder consider one of Computer Technik's package deals or contact IQLR. The QL-2000 was on display at 'Miracle in Newport'. It generated alot of interest. A number of people expressed a desire for a version of the QL-2000 that contained instructions and the necessary parts minus the case itself. This would allow people to take advantage of whatever local specials they see.

The QL-2000 DIY Kit is available from Computer Technik/Jürgen Falkenberg 07231/81058 phone or 07231/81058 fax, or W. N. Richardson & Co. in the UK, or Mechanical Affinity in North America. JDR Microdevices can be contacted at (800) 538-5000.

## HELPFUL HINT (External Keyboard-90 Interface) Tiverton, Rhode Island, USA - Dick Taylor

This was an idea that I hadn't considered of interest to anyone until Tony Firshman commented on it at the "MIRACLE in NEWPORT" show. I have been using Jurgen Falkenberg's external Keyboard-90 Interface for several years and use a QL keyboard top that has a blank plate in place of the keys. I cut a slot in the plate for the ribbon cable connecting the 8049 (now Hermes) chip socket and the Interface box. The problem with this setup was that the Interface box tended to shift around during use and had a tendency to work the 8049 chip loose in it's socket. To correct this, I stuck a small piece of Velcro tape between the plate and the bottom of the Interface box. This not only corrected the problem, but also allows me to move it aside when opening the QL case.

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## QL SOFTWARE

A SELECTION FROM OUR RANGE OF NEARLY 100 PRODUCTS FOR THE QL  
NOT ENOUGH ROOM TO GIVE MUCH INFORMATION HERE HERE, SO PLEASE  
ASK FOR OUR CATALOGUE (PHONE OR WRITE FOR A COPY).

**EASYPTX III part** £40.50  
Simplified pointer environment programming. Part 1 consists of sprite editor, menu editor and superbasic extensions to use menus in your own programs. Applications created using Easyptx III can be compiled with QLiberator. Requires expanded memory, available on disk only.

**EASYPTX III part 2** £20.00  
Consists of appendix manager and enhanced toolkit for control of menus etc in your programs.

**EASYPTX III part 3** £20.00  
Consists of Easyviewer and C library routines, etc.

**QLANIMATE** £50.00  
Superb superbasic compiler, compiles virtually all of basic plus most toolkit commands, etc. Produces faster multitasking code from your basic programs. Compiles resident extensions, use overlays, etc with the latest V1.36. Can be mouse controlled. Expanded memory required.

**BUDGET QLBERATOR** £25.00  
Excellent value, compiles virtually all of superbasic but without some of the additional facilities of the full version. Not mouse controlled. Works on unexpanded QL too.

**DITOLKIT** £10.00  
Compact toolkit of BASIC extensions, ideal for use with QLiberator. Really useful programming commands, can be distributed with your compiled programs if you wish. At this price, a bargain! Suitable for unexpanded QL.

**LINEDSIGN** £100.00  
Vector drawing package, uses outline fonts and clipart, move and resize text and graphics without loss of quality. Ideal for making posters, etc. Supplied with huge range of fonts and clipart on TEN disks! The more memory your system has, the better! Available on disk only, can be mouse controlled (including SERmouse).

**DATA DESIGN 3** £40.00  
Superb, fast pointer driven database with free form field structures, with the option of disk based for large files if required, or smaller files can be kept in memory for speed. You do not have to be able to program this version, but if you add the API package, it can be programmed from basic, C, or assembler. Expanded memory required, disk only. API for Data Design £20.00

**QPAC1** £39.95  
Tony Tobby's superb pointer environment package. In addition to the pointer environment files themselves, this includes tutorials, extensive manual, files menu, channels and jobs menus, easy matching between jobs, shortcuts, etc. Mouse or keyboard controlled, a good introduction to pointer environment. 256k ram minimum, disk only.

**QPAC2** £19.95  
Ideal companion to QPAC1, consists of small accessory programs such as calculator, calendar, clocks, alarm clocks, typewriter, etc. All can be mouse controlled. Pointer environment files included. Can be used with or without QPAC1. Expanded memory required, disk only.

**QTYPT2** £29.95  
Tony Tobby's spelling checker program. Check spelling as you type OR check existing files retrospectively. User interface allows you to write programs which use the dictionary facilities. English, French and German dictionaries included!

**DISA** £29.00  
Interactive pointer driven machine code disassembler. 256k ram min. Disk only.

**MEGATOOLKIT EPROM VERSION** £25.00  
Large toolkit with over 200 BASIC extensions, suitable for use with QLiberator or Turbo. Many examples supplied, extensive manual. Suitable for unexpanded QL.

**DISCOVER** £20.00  
The painless way to move files from QL to PC and vice versa. As simple as copying files between two disks. 256k ram min, disk only.

**MULTI DISCOVER** £30.00  
In addition to Discover facilities, also contains CPM, Unix CPIO, BBC micro and now Spectrum and SAM Coupe file transfer capability. 256k min. ram, disk only.

**TEXTIDY** £15.00  
Assists Discover with conversion of text files by stripping out control codes, etc. 256k ram min.

**CONVERT-PCX** £10.00  
Used with Discover, allows transfer of bit mapped PC clipart graphics in PCX format (a common PC file format) to QL screens or Page Designer pages. 256k ram, disk only.

**QL-PC FILESERVER** £24.50  
Link a PC and a QL via a serial port cable and use this software to enable the two to communicate - the QL can save its files on a PC's disk systems and print to the PC's serial port using normal basic commands like COPY. Works on unexpanded QL.

**BANTER** £25.00  
Simple to use banner maker which uses outline fonts for good quality large text. Prints sideways across up to 4 sheets of paper. Simple to use, menu driven, on screen preview before printing, etc. Sets over 8000 compatible printers.

**IMAGE PROCESSOR 2** £15.00  
Easy to use graphics system, featuring usual graphics facilities, pixel zoom editing, image enhancement, mode conversion etc. 512k, disk only.

**SCREEN COMPRESSION** £10.00  
Reduce the amount of storage required by graphics on disk or microdrive - supports several QL formats. 256k, disk only.

**SCREEN DAZZLER** £15.00  
Unlike the usual screen savers, which simply turn off the display when the keyboard is not used for a while, this one can activate various graphical displays to provide an attractive means of preventing screen burn-in, more like the screen savers on other computers. If you have a compiler, you can even write your own savers by following the instructions in the manual. Pointer environment compatible.

**SCANNED CLIPART 1** £10.00  
NEW! A disk full of compressed scanned pictures (decompression program supplied of course) which can be used in most QL programs (DTP, graphics, etc). Assorted collection, containing many pictures you may not find in other collections. Large number of pictures, a bargain at this price. 128k, disk only.

**PRINTERMASTER** £20.00  
Select printer control codes quickly and simply from a menu to set fonts, page lengths, etc before printing from programs like Quill, etc. 128k, disk only.

**SERMOUSE** £40.00  
Albin Hessler's serial mouse driver system for the QL is now available from DJC complete with a QL style matching black mouse with 9 pin serial connector and UK style serial port adaptor lead. Version 3 driver software. Can now work with The Power Mac. WE PORTABLE CHARGE BATTERY

**SIDWRITER** £15.00  
Print wide spreadsheets or plain text files sideways using a choice of character sizes (down to very small characters) on a 9 pin or 24 pin dot matrix printer. Program can be pointer driven (expanded memory required), or used without pointer on unexpanded QL. We've had many requests for such a program, here it is at last! Available on disk or microdrive.

**EQUIDQY ROUND THE WORLD** £10.00  
An arcade game, ideal for the young at heart! 128k

## SUPPLIES

**FLOPPY DISKS** £0.40  
**DSHD DISKS** £0.70  
**MICRODRIVES** £2.50  
**DISK LABELS** £2.00  
On printer roll  
**ADDRESS LABELS** £2.00  
**MDV LABELS** £2.00  
**MOUSE MATS** £2.50  
Disk box dividers  
£3.00  
In stock once more!

**TERMS:** Discounts - buy 2 programs, claim 5% off each, buy 3 or more, claim 10% off each program. Offer applies to software only. **POSTAGE** - Software is sent post free to UK addresses. Overseas please add £1.00 per program for postage (maximum £5.00). Floppy disks and serial mouse - add postage of £2.50. Labels/mouse mats - add postage of £0.50 per item if only buying these. **PAYMENT** - in UK currency (pounds sterling) only please. Payment by cheque, Eurocheque, Postal Order, cash (and by registered post), or by credit card (Visa/ Access/ Mastercard/ Eurocard/ Comcard). In case of difficulty contact us first to arrange a payment method if none of them is possible for you. Please make cheques, etc payable to DILWYN JONES COMPUTING (not to any other name or abbreviation please, our bank prefers it that way!). If total order value is less than £5.00, add £1.00 to total or we'll make a loss due to high bank charges.



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**5-GAMES PACK** £12.50  
5 'thinking' games in one bargain pack 128k

**OPEN GOLF** £12.50  
Golf playing simulation, with choice of 50 courses each of 18 holes. Score table feature, choice of clubs used, shot strengths, wind, rough, bunkers, etc. 384k memory required, best used with a colour monitor. Disk only.

**GREY WOLF** £12.50  
Submarine warfare simulation, where you are the commander of a submarine in the Atlantic, an exercise in strategy for entertainment purposes. 384k RAM, 25 column monitor required. Disk only.

**QUICK MANDELBROT III** £15.00  
Fractal graphics, mandelbrot set, Julia set, screen dump facility, use mode 4 or mode 8 to generate screens, background calculation option, save and load screens (of course), can optionally use Binary Decomposition Method for plotting. Magnify option. Works on 128k QL, disk or microdrive.

**SToQL** £12.50  
Atari ST screen transfer program for use with Discover. Converts Neochrome or Degas (all three resolutions in p1, p2 or p3 format). 256k RAM, disk only.

**QUIZ MASTER II** £12.50  
Similar to quiz game machines found in pubs and clubs, colourful, 2 sets of questions supplied, you can make up your own for use with this program. 128k RAM, disk or microdrive.

## OTHER SOFTWARE

FOR DETAILS, SEE PREVIOUS ADVERTS

**QLOAD and QREF** £15.00

**S\_EDIT** £20.00

**RANDWPROBTEST000**

**OPD INTERCHANGE** £15.00

**LOCKSMITH** £14.95

**4MATTER** £14.95

**LOCKSMITH & 4MATTER TOGETHER** £29.90

Note: To use 4Matter, you need Locksmith, but 4Matter available separately for users who already have Locksmith.

**MDV TOOLCHEST** £14.95

**FILES 2** £12.00

**FILEMASTER** £12.00

**THE CIPHER** £12.00

**WINBACK 2** £25.00

**BANTER** £25.00

**VULCAN MIXER I** £10.00

**VULCAN MIXER PLUS** £22.50

**PICTUREMASTER** £15.00

**VINTAGE MASTER PLAN** £20.00

**THE PAINTER** £25.00

**THE CLIPART** £12.00

**QUACTAL** £20.00

**PICT CLIPART** £10.00

**SCREEN SNATCHER** £10.00

**TEXT 'N' GRAPHICS** £20.00

**TRANS4** £10.00

**SIDEWINDER PLUS** £24.95

**BIBLE TEXT DISKS** £20.00

**SPRILBOUND** £30.00

**SPRILBOUND SE** £50.00

**QUICK POSTERS** £10.00

**ADDRESS BOOK & LABEL PRINTER** £15.00

**GENEALOGIST 2ND EDITION** £30.00

**BUDGET 128K GENEALOGIST** £12.00

**FLASHBACK** £25.00

**FLASHBACK SE** £40.00

**DIK INDIEN** £12.00

**DBEASY** £15.00

**DEPROGS** £15.00

**NETWORK PROVER** £4.00

**SOLITAIRE** £15.00

**THE FUGITIVE** £9.95

**CRICKET SECRETARY** £12.00

**QUESTION MASTER** £10.00

**QM QUIZ 1** £5.00

**QM QUIZ 2** £5.00

**QM QUIZ 3** £5.00

**COCKTAILS WAITER** £10.00

**FLEET TACTICAL COMMAND** £29.95

**QTOP** £29.95

**PRINTERMASTER** £20.00

**ROME BUDGET** £20.00

**SCREEN COMMUNISM** £10.00

**SLOWGOLD** £5.00

**TASEMASTER** £25.00

**THE LABELER** £10.00

**THE CAT** £5.00

**ROB ROY PACK** £10.00

## MAGAZINES

We now have in stock a limited number of back issues of the QL magazines formerly published by CGB Services and we can also offer individual copies of the new QL magazine 'QLReview' (as the title implies, based on reviews of QL products). Subscription details supplied with orders for any back issues. Individual copies of QLReview (published by the editor of the other magazines described below, QLReview to be launched end of June) available for £2.00 each (UK), £2.50 (Europe), £3.50 (USA and rest of world). We can also offer attractive deals on complete sets of back issues of a magazine.

### QL TECHNICAL REVIEW

A non-games review magazine, 9 issues available at £2.00 each (UK), £2.50 (Europe), £3.50 (USA and rest of world).

**COMPLETE SET** £12.00 (UK), £16.00 (Europe), £24.00 (USA etc).

### QL ADVENTURER'S FORUM

Games based magazines, 9 issues in total available at £1.75 each (UK), £2.25 (Europe), £3.25 (USA etc).

### QL LEISURE REVIEW

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## EASY POINTER III - A Review

ALBIN HESSLER SOFTWARE

Thetford, Norfolk, GREAT BRITAIN - W. Geraint Jones

I have of late, as anyone who reads the Quanta magazine knows, been experimenting with the Pointer Interface, and writing about my experiences to boot. In the middle of learning and writing about programming under pointer in assembler a package arrived from the States containing Easy Pointer and a request to review it from that nice chap from RI you know who I mean.

### *Easy pointer What is it?*

The whole package consists of a very thick manual and three disks, each of which contains one of the sections of the package. The software consists of a number of SuperBASIC machine code extensions a number of executable pointer driven programs, of which Easysprite, Easymenu and Easysource are the main utilities. Also included on the disks are a number of complete examples of windows, menus and an assortment of SuperBASIC and assembler pointer program examples along with a number of library routines.

The purpose of the package is not, as the name implies, to make programming under the pointer environment EASY, but EASIER, in so far as it allows the user to design the programs windows and associated menu items in a safe user friendly environment. I say easier rather than easy, because the hardest part of pointer interface programming is not designing windows, sprites, loose menu items or standard menu structures, but the code necessary to execute the options given in the menus.

It is not my intention to take the reader on a step by step 'idiots' guide of the software and how to use it, but to give the reader a general feel for the package overall and what it can do for you. To this end the package can be divided into five sections vis:

- 1) Easysprite
- 2) Easymenu
- 3) Easysource
- 4) the extensions and
- 5) the manual,

I will for simplicity discuss each section in order.

### *1) Easysprite*

Easysprite is a utility program that allows the user to interactively generate graphic objects. The program is obviously pointer driven and can operate in either mode 4 or 8. The graphic objects allowed under the pointer environment can be divided into three distinct yet related types, these being sprites, blobs, and patterns. All graphic objects are generated as sprites and may be previewed as either static objects or pointers in the preview window. The objects developed within Easysprite may be saved as sprites, blobs or patterns on either an individual or a collection basis. The program also has the ability to generate dynamic sprites. The sprites, blobs and patterns may either be generated manually by filling in each pixel or by using the programs ability to extract a section of the screen from a previously created screen dump. All objects created may also be rotated in 90 degree steps and moved about the grid pixel by pixel.

The ability to generate files containing collections of sprites, blobs and patterns is

### **EASY POINTER III- (CONT'D)**

particularly useful when a number of different items are to be generated in a menu system. However, it is worth noting that the collection files cannot be loaded back into Easysprite and as such should also be saved as separate items. It is also worth noting that due to the nature of blobs and patterns they should also be saved as sprites, thus allowing them to be recalled for possible future modification.

As I have already said the objects are generated as sprites, but may be saved as either a sprite, a blob or a pattern. What then is the difference between the three types of objects.

#### *Sprite Object*

Sprites are made up of two masks the first mask, called the colour mask, defines the colour of each individual pixel within the sprite, while the second, pattern mask, defines the shape of the sprite by defining which pixels within the sprite are visible.

#### *Blob Object*

Blobs are made up of only one mask, this is the pattern mask and only defines the shape of the object. As such in order for a blob to be visible it must be combined with a pattern. The pattern to be combined with the blob must of course be defined separately.

#### *Pattern Object*

Patterns like blobs are made up of only one mask, in this case the colour mask which defines the colour of all pixels within the pattern. Again in order for a pattern to be visible it must have a blob to combine with, which is of course defined separately.

#### *Combining Blobs and Patterns*

When a blob is combined with a pattern a visible graphics object is created eg combining a circle blob with a red pattern results in a red circle. Since a blob can be combined with different patterns it is possible to display the same shape in a number of different colours, and conversely a single pattern can be combined with different blobs, thus enabling the shape of a graphics object to change.

#### *Overall Impression*

My overall impression of this program is that it is a very well thought out and useful development tool, the ability to extract sections of screen images is an especially useful facility. The functions of the program are covered in the manual, the only drawback being a lack of worked examples, especially on the use and storage of more than one object in the programs working area.

#### *2) Easymenu*

This program is pointer driven utility that allows the user to generate their programs front end window, including loose menu items, information subwindows, application subwindows and pulldown menus interactively. The program only generates the information required to define the window, it does not generate any of the code necessary to set up, use or manipulate any of the menu structures this is left to the user via either his/her own assembler code or the supplied SuperBASIC extensions. While all the graphics objects have to be generated externally, the layout of information objects, loose menu items and the colour schemes associated with their current status are set up within Easymenu. The program also allows the user to generate the necessary data structures to create both static and dynamic text menus, but not to control them, this

## EASY POINTER III - (CONT'D)

again is down to the user. What I have already said about the primary window also applies to secondary windows used as pulldown menus by loose menu items etc.

### *Overall Impression*

While the program is once again well thought out and a very useful utility, the same cannot be said of corresponding section of the manual. It is somewhat unfortunate that the manual only describes the commands available to the user, but not how to use them to generate a window with its associated menu items etc. The program is good but requires an inordinately high level of input by the user before any useful output can be produced. The effort required to use this program could, and I believe should, be reduced by the inclusion of a few extra pages in the manual describing in order the operations required to produce an example window.

### *3) Easysource*

This program is very much for the assembler programmer, as its soul purpose is to disassemble the binary code produced by Easymenu to generate standard assembler code. The beauty of this program is that the assembler code produced is very well commented and easily assimilated into the users code.

### *Overall Impression*

This piece of software is the one that makes the package attractive to the assembler programmer, as it enables the other programs to act as a proper development tool for the program front end, markedly reducing the amount of code the programmer has to type and debug.

### *4) The extensions*

These are a series of SuperBASIC procedures and functions, written in machine code, that enable the user to write pointer driven software in SuperBASIC. This has of course already been done in the Pointer Toolkit, so is this a case of re-inventing the wheel. No, its not, the purpose of these extensions is to allow the user to manipulate the menus etc. produced by Easymenu and the pointer interface in general at a lower level than can be achieved from the Pointer Toolkit. This is achieved by allowing the user direct access to the Trap and Vector calls used by the assembler programmer, directly from SuperBASIC, thus giving the user the same power as the assembler programmer from the comparative safety of SuperBASIC.

### *5) The Manual*

The manual supplied is not unfortunately what I would call a true manual, but a reference source. I say this because my idea of a manual is a set of instructions that not only tells the user how the software works, but also shows the user how to use the software in easy to follow steps. The manual consists of three main sections, covering Easysprite Easymenu the SuperBASIC interface, Easysource and the use of the data structures generated by both the assembler and C programmers. While, as stated above, it details the commands available to the user in the various software packages and the SuperBASIC interface, it does not in my opinion go far enough in demonstrating to the user how to use the software to generate pointer driven programs. There are plenty of examples of what can be produced using this package on the disks supplied, but these are finished examples, not worked examples and the manual does not show how to generate them, but merely states that they exist.

## EASY POINTER III - (CONT'D)

### *Conclusion*

The package is well thought out and well designed and to my mind makes the development of the user interface easier by allowing its appearance to be designed interactively thus doing away with what would normally be a great deal of typing in any language. The manual could be improved by including worked examples and explaining exactly what is going on. The manual aside Easy pointer is a package that is of use to anyone who is interested in pointer programming, at whatever level.

*(Editor's Note: EASY POINTER is available from most major dealers worldwide or you can order direct from : ALBIN HESSLER SOFTWARE - Im Zeilfeld 25 , D-7447 Aichtal, Germany or call 07127-56280.)*

## QMATHS I - A REVIEW: Part 2 of 2

Oak Ridge, Tennessee, USA - Mel LaVerne

DIGITAL PRECISION LTD.

In Part 1 of this Review, I covered Qmaths and Qfract. In this final portion, I propose to discuss the Surface Modeller, High Precision Calculator, and Mathematical Compendium, the last being a sort of mish-mash of items that may not have fit neatly into a previous category.

### SURFACE MODELLER

This program depicts the 3-dimensional surface defined by the equation  $z = f(x,y)$  over a rectangular grid  $[x1,x2]$  by  $[y1,y2]$ . Fineness of definition is determined by the user selected number of intervals in the  $x$  and  $y$  directions. The surface is computed only for the selected points and linearly interpolated between points.

To visualize the surface, imagine a sphere having the above grid in its equatorial plane. Further imagine a second plane tangent to the sphere at some latitude and longitude (the viewing angles). Now project the surface defined by  $f(x,y)$  orthogonally onto this second plane. This yields the surface as drawn on the screen.

User input consists of the function  $f(x,y)$ , the grid size, numbers of intervals in the grid, two viewing angles, a scaling mode, and a presentation mode.

For the scaling mode you are offered three options: 1) No scaling, i.e., the surface is plotted as is; 2) Automatic rescaling; and 3) Scaling of the  $z$ -axis.

There are 9 presentation modes, 0 to 8. The choices range from the usual 'wire-frame' with all lines visible to lines drawn only in the  $y$ -direction or  $x$ -direction to hidden line elimination in black and white to hidden line elimination with color.

I find modes 2, 5, and 8 the most attractive (spectacular, even). All three modes are in color, upper surfaces being filled green and lower surfaces, filled red. Hidden lines and surfaces are suppressed. The modes differ only in the sets of lines drawn on the surfaces: mode 2 draws both the constant  $x$  and constant  $y$  lines; mode 5 draws lines only for constant  $y$ ; mode 8, only for constant  $x$ .

Modes 1, 4, and 7 are similar to the above, except for lack of color. Finally, modes 0, 3, and 6 are like 1, 4, and 7, except that hidden lines are not suppressed ("wire-frames").



## QMATHS I Part 2 - (CONT'D)

In general, I find that "Surface Modeller" is easy to use and gives an excellent presentation. Resolution is limited only by the imposed maximum of 40 intervals in either direction (discovered quite by accident; no limit is mentioned in the manual).

Having said all that, I must admit to a few caveats. What the program does is not always what the instructions say will occur.

For instance, we are told that, when the surface has been drawn, pressing F3 will allow changing the view angles. Not so! Pressing F3 causes the prompt "Archiva donde salvar -->" to appear (all prompts are in Spanish; more on that later) and the program waits for a response. I interpret that to be a request for a file name for saving the picture. Supplying a name then engenders a further prompt, "Con Datos ? (s/n)" ("with data ", perhaps?).

The instructions say that if your inputs "generate something impossible", you will get an error message and be allowed to re-edit the input. Not always. For example, I set the viewing angle theta equal to zero in the default function. This appears to be unacceptable and I did get an error message ("Error en linea 1760"). However, the program stubbornly refused to allow editing the offending theta, cycling through the first line of input only (theta, of course, is in the second line). I was able to recover only with a reset.

Finally, with respect to the prompts: the manual blithely says "it is all self evident". I disagree.

### HIGH PRECISION CALCULATOR

This section contains six programs with precisions ranging from 14 to 611 decimal digits, specifically 14, 33, 72, 149, 303, and 611. Why would anyone want (or need) such accuracy? Well, I can think of several reasons.

Some numerical computing schemes require accuracy substantially exceeding the QL's not quite 9 digit precision. One or more of the first three programs would do quite well here in reducing roundoff error.

Public key cryptography depends for its security on the ability to handle integers in the 200 to 400 (or more) digit range.

Finally, consider poor William Shanks. In a pre-computer era, he labored for more than twenty years, with paper and pencil, to compute Pi to 707 decimal places. Unfortunately for him, somewhere around the 528th decimal place he made an arithmetical error, invalidating all subsequent calculations. Using PRECISION611, you can surpass his efforts, calculating Pi to 611 digits in a little more than two minutes. What a feeling of power!

The programs use Reverse Polish Notation, generally referred to as RPN. Anyone who has used Hewlett-Packard calculators is already familiar with the system. RPN is also known as parenthesis-free or postfix notation. "Postfix" simply refers to the fact that an operation is fixed after (post) its operands. All the programs use a Last In First Out or LIFO stack for calculation.

## QMATHS I Part 2 - (CONT'D)

To illustrate the basic system of operation, consider the multiplication of two numbers, say 5 and 9. In the common infix notation (the operator is fixed in between the operands), this is written  $5*9$ . In RPN, we would write  $5\ 9\ *$ . The stack operations would be: 5 is pushed on the Top of Stack (TOS); 9 is pushed on TOS and in turn pushes the 5 down to Next on Stack (NOS). Next, the operator  $*$  is encountered. NOS and TOS are extracted from the stack, the operation performed between them and the result, 45, placed back on TOS.

Illustration of the basic operation is all very well, but how does one check the correctness of a 611 digit product? Just producing a 305 digit multiplicand and a 306 digit multiplier could be a major undertaking, let alone verifying correctness of their product. Fortunately, there is a way out. The quantity  $10^n - 1$  is a series of nines, n digits long and the product of two such numbers is easily determined. Hence, we simply use, for the multiplicand,  $10^{305} - 1$  and for the multiplier,  $10^{306} - 1$ . The input expression to PRECISION611 is then:  $10\ 305\ ^\wedge\ 1 - 10\ 306\ ^\wedge\ 1 - *$ . The product is easily verified to consist of 304 nines, followed by the number 89, followed by 304 zeroes, and terminated with a single one, for a total of 611 digits.

A 610 digit product is even easier: square the quantity  $10^{305} - 1$ , as follows: input the expression  $10\ 305\ ^\wedge\ 1 - \text{dup}\ *$ . The only new item is "dup", a FORTH word meaning duplicate TOS. As a result,  $10^{305} - 1$  is in both TOS and NOS so that when the  $*$  is encountered, we obtain the square. The number is like the above 611 digit number, except that 89 is replaced by 8.

The above procedure, with appropriate values of n, was used with each of the PRECISIONxxx programs to verify correctness. Each passed with flying colors. I recognize that this may not be proof positive that the programs can correctly handle all results of up to 611 digits but I'm satisfied.

The programs are obviously not limited to simple multiplications but can be used with a host of different operators, trigonometric, algebraic, exponential, and others. The manual lists 47 operators in all.

The manual also includes a number of worked out examples and an illustration of setting up an iteration.

### MATHEMATICAL COMPENDIUM

This section appears to have been written by a number of authors who spoke neither to each other nor to the author of these instructions. For instance, the Introduction states "We have deliberately not used the finer features of SuperBASIC (REPEAT, ...)". However, I find that, e.g., "SQR PATTERN" uses REPEAT..END REPEAT and "QUICKSORT" uses PROCEDURE, REPEAT, LOCAL, etc. This hardly "ensures that the routines can be typed into humble machines (PCs)...".

Some of the problems I have encountered in the "Compendium" follow.

"SPEED ACCUR" claims five accuracy tests. However, test 3 never appears; a heading is printed but nothing happens. We then move on to tests 4 and 5.

## QMATHS I Part 2 - (CONT'D)

"COLLATZ\_HYP" cannot run as written (except for  $n = 2$  or  $3$ ). The problem is in line 155, which reads: `155 IF N<>N*INT(N/2) THEN GO TO 150`. The solution, of course, is simply to delete line 155. But why was it there in the first place?

"FACTORS" claims that an error message will appear if a negative number is input. Not so; the program simply ignores the input and asks for another number. Incidentally, "just deserts" should be "just desserts"!

"EASTER DAY" fails for any odd numbered year. Again, the problem is a bad test. The condition "`Y<>2*INT(Y/2)`" occurs in line 150. Since this is true for any odd  $Y$ , the program returns to the input line. The cure here is to change the condition to `Y<>INT(Y)`, which has the side benefit of error-trapping non-integer input.

"STATISTICS", if asked for mean and variance, says it returns the mean and standard deviation. Unfortunately, variance and standard deviation are different quantities.

"SIMPLEX" cautions against entering negative or non-integer values, because "all hell will break loose.". I tried some illegal non-integer values; the program quite calmly processed the data with no problem. In fact, the results differed little from those for the proper integral input!

"FITANDPLOT" declares that selecting more terms than the number of data points will (a) make the system over-determined and (b) give an error message. (a) is true enough but (b) does not happen. I must admit, though, that the resulting polynomial is worthless as a representation of the data!

I find the plots for "FITANDPLOT" and "FIT\_EXP" to be of little or no value, primarily because of the lack of any scales on the coordinates.

It might appear from the foregoing that I consider the Compendium to be of little value. Not so; I found the sections "SORTING" through "LINEAR SYSTEMS" to be quite useful, as well as some parts of "ITERATION". "NUMERICAL INTEGRATION" was of especial interest (personal preference, perhaps?), the section on Romberg's method, in particular.

I have checked "ROMBERG\_METHOD" to some extent by integrating  $dx/x$  from 1 to 2. This should yield  $\ln 2$ . I obtained 0.6931472 as a result. As a check, I used "PRECISION014" to get the 14-digit result 0.69314718955994, which rounds to 7 decimal places as 0.6931472, an excellent check.

The instructions for "ROMBERG\_METHOD" give the impression that Romberg's method of integration simply involves repeated trapezoidal (note: US usage; 'trapezial' in UK usage) integration, doubling the number of intervals each time. Actually, there is considerably more to the process. For anyone interested in what is actually going on, I suggest perusing a book on numerical methods, such as "Applied Numerical Methods" by Carnahan, Luther, & Wilkes, page 90 et seq.

On return home from "Miracle in Newport" (If you weren't there, you should have been!), I found that QL World also had a review on QMATHS. If you have access to a copy

## QMATHS I Part 2 - (CONT'D)

of QLW, you might be interested in another slant on the same subject. I was puzzled by the reviewer's reference to "QMATHS Part Two"; my disk says it is Part One.

Since submitting Part One of this review, I have been playing about with Qmaths and have come across a curious result in the manipulation of complex quantities. The Help file on factoring says, in part, "Complex: will factorize into real and imaginary parts". One would expect, then, that the sequence Transform; Expand; Transform; Factor; Complex would yield a final result properly separated into real and imaginary parts. Well, maybe.

I have so far tried factoring  $(a+bi)^n$  for  $n = 2$  to  $10$  (Note that the expression for  $n = 1$  is already in proper form). The "curious result" is that for  $n = 2, 4, 6, 8, 10$ , the expression is properly separated. But, for odd  $n$  (3, 5, 7, 9), the procedure fails! For instance,  $(a+bi)^2$  transforms to  $a^2 - b^2 + 2*ab*i$ , as it should. But,  $(a+bi)^3$  transforms to  $-b^3*i - 3*[a*b^2 - b*a^2*i] + a^3$ , correct in its way, but not properly separated.

*(Editor's Note: You can read the first part of this review in our previous issue (Vol. 3, Issue 1). In the near future look for Mel to review QMATHS II. QMATHS I and II are available from DIGITAL PRECISION LTD, please see their adverts elsewhere in this issue.)*

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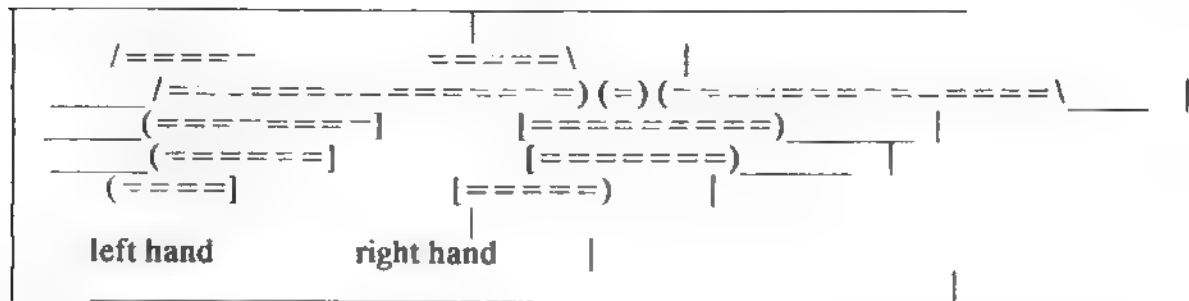
**Wilmington, Delaware, USA - Herb Schaaf**

Somewhere in this issue of IQLR there should be a page with lots of dots on it; dots that seem to be a random pattern, with a pair of small hollow boxes along one edge.

If you change your focus while looking at a RDS and allow the image processing computer in your brain to take over, a three-dimensional effect will be seen.

Programs to generate RDS on your QL should also be somewhere in this issue. One program is in SuperBasic and should run on any QL. Another is source code in C that worked with the C-68 compiler version 1.05. I've tried to make both programs have about the same 'look and feel' and you might enjoy comparing SuperBasic with C. If the REMarks and \*/comments/\* are more verbose than you like just leave them out. If you want to save screens in the SuperBasic version change lines 950 and 960 to suit your system. There is stuff in the C program that you might want to chuck out if PBM, UNIX, X-terminals etc. aren't of interest to you.

Some people may not be able to 'see' the RDS effect due to the way their eyes work or because of vision problems. A quick test of your vision is to touch the tips of your index fingers so they are pointing to each other, then hold them out at arms length in front of you and look through them, focusing on a distant wall or the far horizon. Now spread your arms slightly so that a 1/4" gap exists between your fingertips. Focus on the wall or horizon and look for the illusion of a 'little sausage' floating in between your two fingertips.



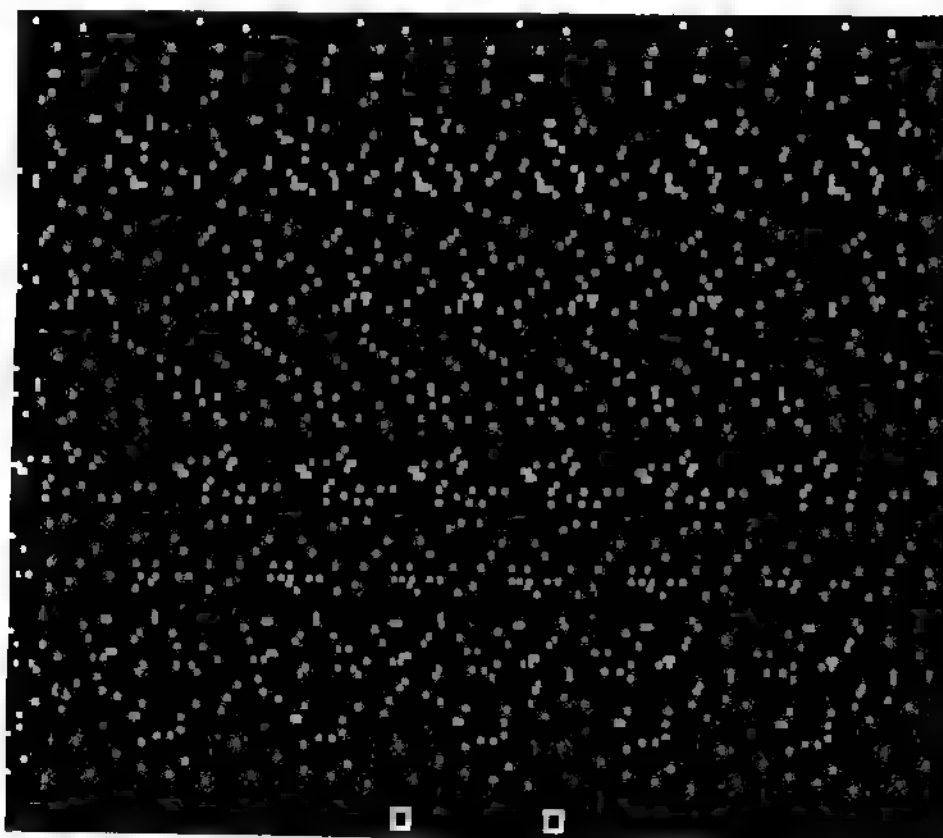
**If you 'see' the little sausage then you should be able to see the RDS effect as well.**

The 2 hollow boxes on the RDS are guides to help you get the proper de-focusing and alignment. They are placed at the bottom edge and will 'appear' as 3 or 4 when you look 'beyond' or 'half-way to' the RDS. Make sure they are all in a line by tilting the RDS, your head, or both. This is critical for most (but not all!) people. If you 'see' 4 guide boxes, change your focus somehow so that the 2 in the middle merge into 1; then there will be only 3 guide boxes. When you 'see' 3 guide boxes then lock-on to the center one and gradually take in the RDS, verifying from time to time that the center guide box is still clear.

In QHJ #9 (QL Hacker's Journal June 1992) there was a article by me about RDS on pages 5 to 11 that included several other 'shapes' to try. QHJ is distributed over the Internet, so my write-up was picked up, passed around, and part of it was in QUANTA of January 1993 on pages 22 to 25.



# RDS - (CONT'D)



% density ? 5  
Block size ? 2

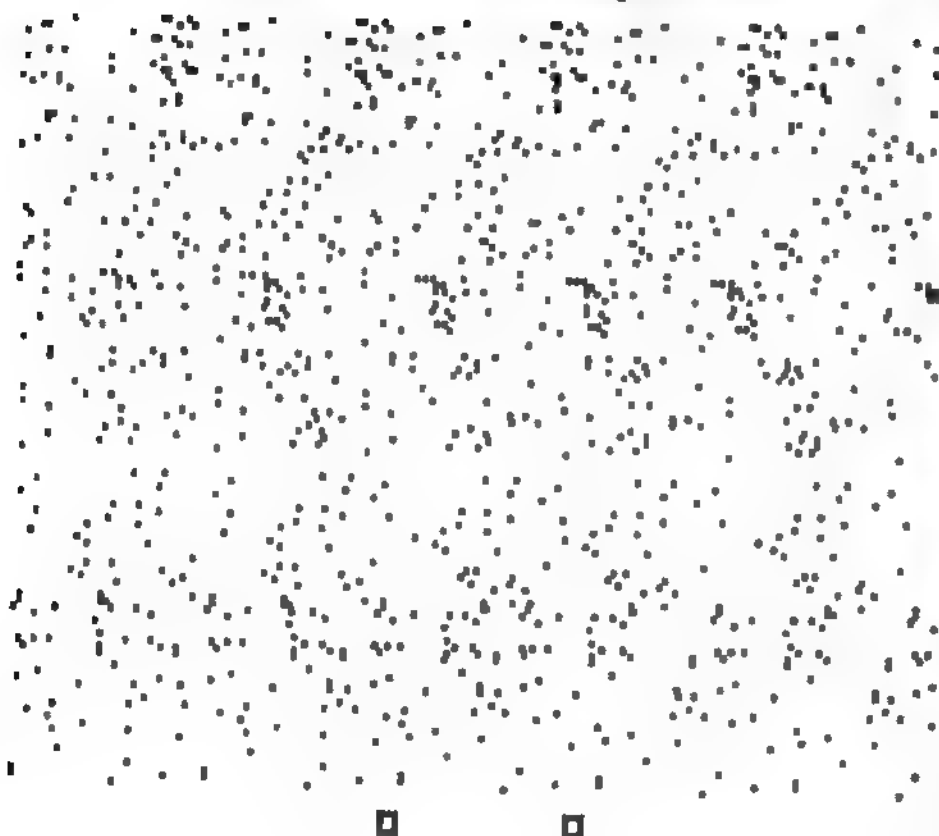
## Swath Data:

30 across  
120 down  
3600 total  
180 dots/swath  
5 % density

Elapsed time:  
15 seconds



## RDSphere -SCR



## Swath Data:

72 pixels wide  
864 = 1204 blocks  
of size 2 x 2  
216 blocks/swath  
out of 4320  
= 5 % density

Radius 150  
Width 57.5  
Out:In 2.5

axis of rotation ?  
X, Y, or Z ?  
or None

## RDEscher -SCR

## RDS - (CONT'D)

The version here is an 'improvement' to my first algorithm as I am afflicted with "Babbage's ailment"; thus I tweak the code, modify the design, and 'keep on adding creatures'. As mentioned in the original QHJ, I am especially proud of my 'Escher knot'. Let the editor know if you are interested and I can describe some of the complicated ways I found of doing it. With lots of memory such as Trump card or Gold Card I can show the Escher knot spinning, revolving, tumbling in 3-space. I've even got two in motion in the same space at the same time, a red one rotating on the Y axis and a green one revolving about the X axis (or is it red on X and green on Y ?).

Try RDS on your QL and share your interesting ideas with the rest of us. I welcome any thoughts you may have to enhance, improve, clarify, embellish, modify, etc. the programs. I might have 'forgotten what I was doing' but if there are questions as to why I did what I did the way I did I'll try to reconstruct the crofty crime for you.

For those who are on the Internet you may want to read the newsgroup alt.3d where they call these things SIRDs or Single Image Random Dot Stereograms.

---

### SuperBasic Program that generates RDS Sphere

---

```
100 REMark RDSphereQ_has
110 REMark H.L.Schaaf June 10,1993
120 REMark ref. Mathematica Journal Winter 1991 V.1,N.3,p.69-75
130 REMark 'Random Dot Stereograms' by Dror Bar-Natan @ Princeton
140 REMark dror@math.princeton.edu
150 :
160 REMark the following are easy enough to edit in SuperBasic
170 REMark so no 'user_input' is provided as in the C version
180 ipl_dis = -20 : REMark displacement of image plane, + is closer
190 obj_dis = 10 : REMark displacement of object, - is more distant
200 iwide = 360 : ihigh = 240 : REMark image width and height
210 ytox = 4/3 : REMark y to x aspect ratio of QL blocks
220 swide = 60 : REMark swath width
230 zscale = 8 : REMark adjust for depth of Z axis
240 radius = 8*8 : REMark size of sphere
250 diam = 2*radius
260 diamsq = diam*diam
270 :
280 REMark set up window 1 for RDS display
290 REMark window 2 for prompts and inputs
300 REMark window 0 for errors and control
310 MODE 4 : CSIZE #2,1,0 : CSIZE #0,0,0
320 WINDOW #1, iwide+8,256,0,0 : PAPER 0 : INK 7
330 WINDOW #2,144,190,368,0 : BORDER #2,2,2
340 PAPER #2,4 : INK #2,0
350 WINDOW #0,144,64,368,192 : BORDER #0,2,4
360 nk = 7 : REMark ink color 7 = white
370 CLS #0 : CLS #2 : CLS #1
380 :
```

## RDS - (CONT'D)

```
390 REMark ask for density and block size
400 INPUT #2; " % density ? ";dens : density = dens/100
410 INPUT #2;"Block size ? ";bk
420 :
430 REMark work out rest of factors
440 hb = bk/2 : REMark half block
450 ac = swide DIV bk : REMark blocks across (columns)
460 ns = 2*ac : REMark allow for left shifts
470 dn = ihigh DIV bk : REMark blocks down (rows)
480 RANDOMISE(32000) : REMark force repeatability
490 swa_dots=INT(density*ac*dn)
500 swa_blks=ac*dn
510 REMark geometric reference coordinates for center
520 xcctr=(iwide-swide)/2 : ycctr = ihigh/2
530 :
540 d_begin = DATE : REMark start timer
550 recap : REMark remind us of the parameters
560 guide_boxes : REMark help us find it
570 :
580 REMark a function to return the 3D value
590 DEFine FuNction sphere(x,y)
600 LOCAl xs,ys,xx,yy
610 xs=ABS(xcctr-(x+hb))
620 ys=ABS(ycctr-(y+hb))*ytox
630 xy = (xs*xs+ys*ys)
640 IF xy > diamsq
650   offset = ipl_dis
660 ELSE
670   zz = diamsq-xy
680   z=SQRT(zz)
690   offset = z + obj_dis
700 END IF
710 RETurn offset DIV zscale
720 END DEFine : REMark FuNction sphere(x,y)
730 :
740 REMark put random dot into first swath
750 OVER 1
760 FOR i = 0 TO swa_dots
770 rdot = INT(RND (0 TO (swa_blks)))
780 ydot=bk * (rdot DIV ac)
790 xdot=bk * rdot - ydot*ac
800 BLOCK bk,bk,xdot,ydot,nk
810 REMark build remaining swaths
820 FOR j = 2 TO ns
830   ZD = sphere(xdot,ydot)
840   xdot=swide + xdot - ZD
850   IF ((xdot + bk) > iwide) : EXIT j
860   BLOCK bk,bk,xdot,ydot,nk
870 END FOR j
880 END FOR i
```

## RTD - CONT'D)

```
890 :
900 d_end = DATE :REMark stop timer
910 d_lap = d_end - d_begin
920 PRINT #2\\" Elapsed time:"\" ";d_lap;" seconds"
930 :
940 REMark save screen to ram or other device if you like
950 REMark SBYTES O ram2_rds_scr,2^17,2^15
960 REMark PRINT #2\\" sbytes saved to\" ram2_rds_scr"
970 STOP
980 :
990 REMark create guides to help get proper 'focus'
1000 DEFine PROCedure guide_boxes
1010 gdlx=(iwide-swide)/2 : gdly=ihigh+6
1020 gdrx=(iwide+swide)/2 : gdry=gdly
1030 BLOCK 8,8,gdlx,gdly,nk
1040 BLOCK 4,4,gdlx+2,gdly+2,0
1050 BLOCK 8,8,gdrx,gdry,nk
1060 BLOCK 4,4,gdrx+2,gdry+2,0
1070 END DEFine guide_boxes
1080 :
1090 DEFine PROCedure recap
1100 REMark recap
1110 PRINT #2\\" "; : UNDER #2, 1
1120 PRINT #2;"Swath Data:" : UNDER #2, 0
1130 PRINT #2;" ";ac;" across"
1140 PRINT #2;" ";dn;" down"
1150 PRINT #2;" ";swa_blks;" total"
1160 PRINT #2;" ";swa_dots;" dots/swath"
1170 PRINT #2;" ";(INT(10000*swa_dots/swa_blks))/100;" % density"
1180 END DEFine recap
1190 :
1200 REMark End of RDSphereQ_has
```

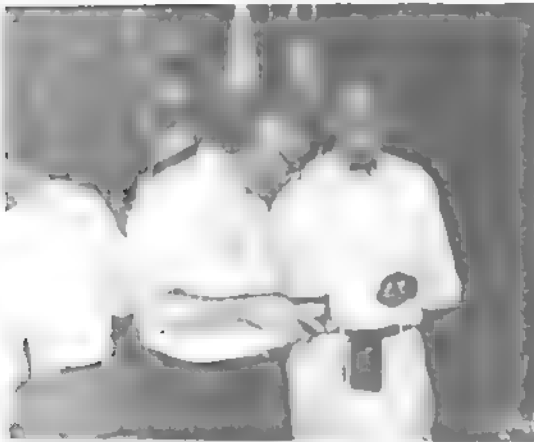
*(Editor's Note: Due to space limitations we cannot include the 'C' listing of RDS in this issue. If you'd like a copy of the 'C' listing, send a stamped self-addressed envelope to IQLR.)*

As this is Herb's first article for IQLR (the first of many, we hope!) we thought you'd like to know a little of his background.

Herb Schaaf built a ZX-81 from a kit; the excitement and thrill of programming has never stopped. He's been a member of the CATS group (Capitol Area Timex-Sinclair) since 1984, making the monthly commute from his home in Wilmington, DE to the CATS meeting in New Carrollton, MD; often carpooling with Tom Robbins, Bob Diggs, and Duane Parker. While attending "Miracle at Newport" he put his RDS on as many QL's as he could, in addition to his own. Herb is a member of the Academy of Lifelong Learning at the University of Delaware.

Herb's e-mail address is: [hlschaaf@brahms.udel.edu](mailto:hlschaaf@brahms.udel.edu)

# MIRACLE in NEWPORT



Al Boehm of NESQLUG (foreground) discussing the HDD interface with EEC's Bill Richardson.



OOPS! Tony Firshman caught dangling his Minerva MK II in public.



John Impellizzeri describing to Don Waltermann the size of the one that got away.



Stuart Honeyball (beard) holding court, and discussing his new QXL card.



Bill Cable (background) with A. Parker Lewis (left) and Kenton Garrett (right) in a lively conversation of Bill's new program "QLERK".



Frank and Carol Davis of Update Magazine & Mechanical Affinity setting up before the show. Two of the busiest people at the show.

# MIRACLE in NEWPORT

POST SHOW DINER AT THE NEWPORT BEACH CLUB



From left to right, Mel and Eleanor LaVerne in deep discussion with Bob Dyl.



From left to right, Bob Diggs and Herb Schaaf of the CATS group, Paul Holmgren and Frank Davis of Mechanical Affinity.

*Photography courtesy of Megan & Roy Arsenault*



Will and Judy Horton from the NESQLUG group who were such a great help during the show.



From left to right are Bob Malloy, Joe LaPunzina, and Ken Lang all from the LIST group.



## SUNDRY IQLR ITEMS

We have a limited supply of "Collector's Editions" of IQLR in the following configurations: Volume 1, Volume 2, and Volumes 1 & 2 combined. All have heavy laminated covers and are spiral bound. Prices are as follows:

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## IQLR T-SHIRTS



In the picture to the left Dick Taylor can be seen modeling our new IQLR T-Shirt. An enlarged version of our new logo appearing on the cover of this issue, silk screened on a high quality American made T-Shirt. The shirt is ASH-GREY in color with the logo in brilliant BLACK. Sizes available include Medium, Large, X-Large, and Double X-Large. Sweatshirts will be available in the Fall, watch for our announcement.

How can you get one ??? Well, there's the normal way (see prices listed below), or you can sign up two NEW subscribers to IQLR and get one FREE. Please note, the person applying for the FREE T-SHIRT must send in the subscriptions themselves, not the individual new subscribers (this promotion does not apply to other offers that exist).

\$10.00 US	\$12.00 CANADA
\$15.00 BRITISH ISLES	\$15.00 EUROPE
\$16.00 C&S AMERICA	\$20.00 *R of W

ALL prices quoted above are US FUNDS with the differences due entirely to postal rates for AIRMAIL service to the various areas of the world. As always we can accept £ or DM bank notes (currency) equivalent to the US \$ amount.

## HELPFUL HINT (HOW TO KEEP DISK LABELS CLEAN)

On a trip to the local hardware store I picked up a roll of 2" wide CLEAR packaging tape, on the attached card came a list of different uses for the tape including one that suggested using it to protect shipping labels. You guessed it, before peeling the labels off the protective backing, I place the clear 2" tape over the printed area and then trim off the excess tape. Besides keeping my labels clean, it makes it easier to place the label on the disk, because it keeps it flat, no more wrinkles.

## MECHANICAL AFFINITY SUMMER SALE

This is our Golden Opportunity Sale! For a limited time only, as we made a great deal at the recent Miracle in Newport Show and are passing on the savings to you. When this special purchase sells out we will go back to our regular prices for these items. This offer expires August 15, 1993 or when supplies run out, at which time prices will revert to normal (though we always try to have some great prices).

MINERVA MK1 the ultimate ROM upgrade for the QL plus the HERMES 8049 co-processor replacement chip (normally \$185) now only \$75!

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GOLD CARD with the MINERVA MK2 and the HERMES for only \$420!

We have also added many new products to our range of QL

hardware and software. At this point in time we at Mechanical Affinity feel we have the largest range of both hardware and software of any dealer. Please request a copy of our newest catalog. To show you some of the new products we are now carrying in our stock, please see below.

QL CENTRONICS INTERFACE for both SER1 or SER2 to parallel printer. Newly redesigned to take up less room. It defaults to 9600 baud, but is able to switch baudrate and comes with a 3 meter long cable. It is available for \$44.

FALKENBERG HARD DISK DRIVE CARD for the QL. This will allow you to use a MFM or RLL hard drive, upto 416 meg with your QL. For the HDD interface with either an MFM or RLL controller the price is \$310. We also have available the HDD card, controller, case with power supply and 40 meg hard drive for \$475. This interface requires that you have a separate BUS EXTENDER CARD to allow you to have more than one peripheral out the expansion slot.

QL-BUS-Driver for the Trump Card based QL, gives you a 5 slot expansion board that follows the QL standards for expansion. This is available for \$75. The 2 slot version for the Gold Card is \$45.

Also new to our stock are the following items. The longer we do this the better we seem to get. With the support of our customers this is a true statement.

## MECHANICAL AFFINITY SUMMER SALE

QL KEYBOARD-90 INTERFACE now on sale at \$98. This allows you to replace the keyboard that came with your QL by using an IBM XT/AT keyboard externally. This is great for those who want to place their QL in a tower or desktop case, or for those who have just gotten tired of replacing membranes every few years.

QUALSOFT TERMINAL SOFTWARE is the best commercially available terminal program for the QL. It comes on disk or MDV. It can multi-task with all popular QL front end programs, it has a simple text editor to help with uploads/downloads and with your E-mail. It allows you to do screen dumps while online, and if you combine it with a HERMES then you can reliably use it with all known high speed Hays compatible modems as well as Tandata, etc. We have it for only \$45.

QXL CARD for the IBM. This simple plug in card for the IBM and compatibles allows you to turn a mundane IBM into a full blown super QL. This can give you from 1 to 8 megs of memory, improved graphics capability, and more speed than the Gold Card. Call us to discuss your needs on this and let us work out a deal you can be pleased with. This allows you to run the QL card as a simple application program on the IBM, giving you the best of two worlds. We have them in stock as of now.

Other new items we have added to our inventory include the following:

TEXT87 PLUS4, QL word

processor; 2488 DRIVERS for the 24 pin printers and bubblejets; TYPESET90-DESKJET drivers for all HP deskjets; TYPESET90-EPSON drivers for Epson lasers; FOUNTEXT88 + FOUNTE89 optional dot-matrix drivers; PLUS4 PUBLISHER (the publisher pack) to allow you to combine PLUS4 and LINEdesign to make the best use of text and graphics; LINEdesign and DATAdesign from PROGS are the new top of the line vector drawing package for the QL (a massive new product that enables you to draw, print, scale, rotate any picture or text, and will look crisp and sharp), and the newest version of DATAdesign (which has been completely rewritten so that files can be disk based and larger than available memory, with the bonus that all files are now multi-user).

We also now have available for sale the latest version of QTOP, the program that many call the definitive front end for all QDOS compatible machines. It now offers an icon based FILE-MANAGER such as is found in Windows. We have it for only \$52.

TO ORDER FROM US SEND CHECKS, MONEY ORDERS, CASH (foreign add \$3), or C. O. D., PAYABLE to Frank Davis or Paul Holmgren to

MECHANICAL AFFINITY  
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PERU, IN 46970

OR

MECHANICAL AFFINITY  
5231 WILTON WOOD COURT  
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317-473-8031 FRANKS PHONE

SERMouse is a software driver that allows you to connect a PC type serial mouse to one of the QL's serial ports. No disassembly of the QL is necessary. The mouse can then be used to control the pointer if you're using the pointer environment allowing much easier and faster control than the cursor keys. The mouse can also emulate the cursor keys for programs that don't use the pointer environment, and will also work if you don't use the pointer environment at all, the mouse then mimics the cursor keys.

In order to connect a PC type serial mouse to the QL you must make or otherwise obtain a simple adapter cable. Most serial mice use a female 9 or 25 pin sub-D connector and the QL will have either a 6 pin connector (UK) or a sub-D9 type. Even if you have a 9 pin mouse and a QL with 9 pin serial ports you cannot simply use a straight through adapter as the pinouts are different. Instructions are given on how to wire the cable, although they can be confusing at first glance. Study them carefully and make sure you use the proper diagram pertaining to your mouse and QL connector types. If you are handy with a soldering iron and wire tracing you could also replace the connector on the mouse and rewire it so it would plug directly into the QL.

Getting the right type of mouse is also important. SERMouse was designed for a 3 button PC serial mouse. It will also work with a 2 button serial mouse. You can usually find these quite inexpensively (under \$20) at local computer shows and stores. Some of these mice will have a switch to allow them to work in two types of modes for the PC. This switch should be in the PC or Mouse Systems mode rather than Microsoft mode. Other mice have this same switching done by software. Try and avoid these types, although the instructions do give some alternative wiring hints that may get them working. I definitely wouldn't spend a lot of money for some 'super' mouse. Since every mouse requires power from its host computer there is the possibility that some will draw more current than the QL's port can provide. The first mouse I tried (\$15) would only work after it and the QL had been powered up for a while and occasionally would stop working. I tried a second mouse (\$10) and it works great all the time.

Fortunately the hardware side is the hardest part. The software is quite easy to use. Simply LRESPR or EX the code (or the equivalent if you don't have TK2). The driver can be loaded either way. If you LRESPR it, you will have some new extensions to SuperBASIC to control the mouse driver. If you start it as a job (EX) then the commands are not available but you can control the job like any other in QDOS. The SuperBASIC extensions allow you to set the mode (pointer or cursor), set the speed of the mouse (how fast the pointer moves in relation to how you move the mouse), and reset, suspend, enable and remove the driver. There is also a screen blanker provided. While these are quite common on most computers including the QL, most will not turn the screen back on if the mouse is moved. The included blanker will turn the screen on if any key is pressed or the mouse is moved.

The mouse driver's default parameters can be changed using the standard pointer environment Config program. I would recommend not changing anything other than what port you are using until you get the mouse working correctly. After using it for a while you get a better feel for how fast or slow you want the mouse and what function the mouse buttons provide. There have been some comments in the QL press on using the proper driver depending on what type of serial connectors your QL has. There are

## **SERMouse - (CONT'D)**

English and German versions of the driver provided. My experimentation has shown that the driver does not matter. There appears to be no difference other than when you are using the configuration program. The prompts will be either in English or German. Both versions seem to work just fine on my USA QL. (Other than I can't understand the prompts in the German version).

SERMouse contains automatic support for the Hermes replacement IPC if you have it. The manual tells you how to configure the driver if you have Hermes. When the driver loads it will detect Hermes and set only the input baud rate of the port the mouse is using. Anything that changes the system baud rate will not affect the mouse. If you don't have Hermes, SERMouse still tries to allow you to use both serial ports. It remembers the baud rate before it initializes and then sets it to 1200 for the mouse. If a program opens a channel to the other port the mouse driver will suspend itself and set the baud rate back to the previous setting allowing you to use a printer, etc. When the channel is closed the mouse driver will enable itself again. The manual explains what to do with programs that don't close the channel right away. Hermes is highly recommended for use with SERMouse.

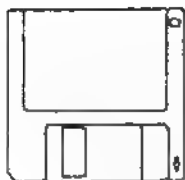
SERMouse is a great addition to the pointer environment and is even better with Hermes. It also works well with or without a Gold Card. Its only possible drawback is that it does take up one serial port, although an advantage is you do not have to open the QL case to install it like an internal mouse. Depending on how many serial devices you want to hook up to the QL's ports you might be able to use a serial cable switchbox. This is what I currently use.

My printer and modem share SER1 through a switch and the mouse has SER2. Since the mouse is really only using the input of one port, the output should be free. However SERMouse uses the unused output line as a negative voltage source for the mouse. (Mice require +5v, -5v, ground, and data). You could externally power the mouse or even use the QL's -12v supply but there is still the problem of the software. Even with Hermes and Minerva allowing split input and output baud rates the driver opens the port for the mouse and any other program will get an 'in use' error if it tries to use the port. I would like to see a way of having a printer and mouse share one serial port if possible. With a printer only receiving data and a mouse only sending data it should be possible at least as far as the hardware goes. Whether or not QDOS will allow it remains to be seen.

SERMouse can be obtained direct from Albin Hessler or from various QL dealers including Jochen Merz Software, W.N. Richardson & Co. (EEC) and Mechanical Affinity.

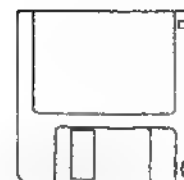
The mouse I currently use has the following information on it: Keen Mouse, FCC ID: HQXKEM-260, Model No: KEM-260. I have seen this same ID and model on other mice that look just like this one. The only difference was the brand name. The mouse that gave me some trouble was an Identity Systems Technology Inc. IDMOUSE-C, FCC ID: IOWCM-290.

*(Editor's Note: Please note ALBIN HESSLER SOFTWARE's address in the editor's note at the end of the Easy Pointer III review.)*



# QUBBESoft P/D

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**QDOS Reference Manual** - This book is a must for all m-code programmers. It explains how to use QDOS, all traps and vectors, the Thing System, the HOTKEY System II and much more. It points out which features work on a QL, an Emulator and how to write compatible for future operating systems. DIN A5, over 170 pages. **DM 89,90**

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✓ "As you might surmise by this time, I am impressed by QMATHS's abilities. Having noted that DIGITAL PRECISION's advertising tends to be loaded with superlatives (Incredible, ultimate, superb come to mind), I had approached this evaluation with some scepticism. That scepticism has vanished." > INTERNATIONAL QL REPORT (IQLR, available from Miras Systems) May/June 1993 issue, Official Review by M.Laverne commissioned by IQLR (who bought their review copy of the program).

✓ "PERFECTION is an exciting, full-flavoured, general purpose word processor of incredible capacity... PERFECTION has now been outshone by the recently released PERFECTION SPECIAL EDITION... The discoveries began to trip over themselves as PERFECTION SE responded to the keyboard with unexpected speed and intelligence... PERFECTION SE is blindingly fast at most things, and you are never left waiting for it. PERFECTION is everything that Quill never became: easy to use, very flexible, loaded with genuinely useful features, clearly multi-tasking, capacious and incredibly fast. The SPECIAL EDITION offers 12 cylinder power and luxury to an already impressive package." > SINCLAIR QL WORLD magazine Official Review, April 1993 issue, by THE Mike Lloyd of Keyword Index / New QL User Guide fame.

✓ "I find PROFESSIONAL PUBLISHER an outstandingly good program that really does allow highly professional documents to be produced. For your interest I have included a few samples of work done for school using a combination of PERFECTION, PROFESSIONAL PUBLISHER, QUICKLASER and EYE-Q. You will be pleased to know that the quality has been rated so highly that people do not believe it can really have been done with just a QL... I must stress that I am already highly impressed with, and very satisfied by, the performance of PROFESSIONAL PUBLISHER and all the other DP programs that I use... I seem to learn something new that can be done almost each time I use the program. Very many thanks for helping to keep the QL ahead of the field." > Martin J Neave, Headteacher, Watton County Jnr School, Brandon Rd, Watton, Norfolk IP25 6AL (unsolicited letter dated 18 May 1993 ordering more programs: Mr Neave had paid full price for everything).

✓ "LIGHTNING SPECIAL EDITION accelerates QL operation as nothing else does... more than 10x is achievable and 2x-4x is typical. I could not fault LIGHTNING SPECIAL EDITION on anything. It is a clear winner and a best buy at £49.95." > SINCLAIR QL WORLD magazine Official Review, April 1990 issue, by Ron Massey, who wrote EDITOR (bought full price) was "Superb" in an earlier review.

✓ "PERFECTION is well named" > R.H.Petford, Kingston Hill, Surrey, KT2 7LJ (unsolicited letter received May 25, 1993 - another full price purchaser & upgrader).

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✓ "I am aware that over the years Digital Precision has given considerable support to the QL scene but seldom, if ever, can there have been such estimable service as I recently encountered with PERFECTION PLUS." > The Hon. W.D.R. Spens, Bridgewater, Somerset, TA5 1HG, QUANTA magazine, March 1992 issue. Mr Spens bought a lot of his software from Digital Precision, all at full price of course.

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✓ "I have found (PERFECTION) to be simply excellent, fast, packed with features and very well thought out. I can find little to say that will convey just how good this program is, except to quote Digital Precision's own advertising. PERFECTION will blow your socks off. PERFECTION is the program that Quill users have been waiting for." > SINCLAIR QL WORLD magazine first Official Review, May 1991 issue.

✓ "Digital Precision (DP) decided to begin work on a replacement for Quill which would be very quick, simple to use and contain lots of excellent features - something upon which DP have built a very strong reputation in the QL market. Overall, the speed-up (of just the first release of PERFECTION - it is much faster now) on even a humble QL with Trump Card is amazing when compared with Quill (or any other word processor). On top of this, the program provides many excellent and well thought out features, each of which is easy to use... (it) is certainly years ahead of the competition on the QL (and even on many PCs)." > R.Mellor, c/o CGH Services, Cwm Gwen Hall, Pencader, Dyfed SA39 9HA; Official Review of the very first version of PERFECTION in QL TECHNICAL REVIEW issue 7, and the reviewer personally bought his own copy of this program, and many others at full price, from Digital Precision. Earlier QL-TR reviews pronounced LIGHTNING (just the standard version) superior to the competition and ADVENTURE CREATION TOOL excellent.

✓ "As a recent user of PERFECTION PLUS SE, may I add my thanks and praises to the ones I am sure you have already received... keep up the excellent work." > R Stawson, East Molesey, Surrey KT8 0BP (unsolicited letter from full price purchaser).

✓ "At about 360,000 words, the Mega SPELLCHECKER dictionary does not have much competition, on any computer! (Spellchecking) is about four times as fast as the best figures I have seen with other checkers on QL and PC." > SINCLAIR QL WORLD magazine official review of PERFECTION spellchecker, September 1992 issue, by Bryan Davies of Troubleshooter repulse (review copies of all the competing products supplied to SINCLAIR QL WORLD by their respective publishers).

✓ "I have been using PROFESSIONAL PUBLISHER for about eighteen months now... what you can do with it is colossal... I got Digital Precision's QUICKLASER. The results are as good as (Digital Precision) says in its advertisements." > P Hamill, Peterborough, Cambs PE8 6RH, QUANTA magazine, Volume 9 issues 4/12. Mr Hamill (full price purchaser) then makes suggestions to users re optimal page sizes.

✓ "Once again I would like to say thank you for your help. I would like to tell the world what nice guys you are but unfortunately I have no contact with the outside world." > J.Bailey, Godshill, Ventnor PO38 3JJ (full price purchaser, 24 May 1993).

✓ "PC CONQUEROR GOLD SPECIAL EDITION is an excellent product, accompanied, as so often with Digital Precision software, by a comprehensive and informative manual. The program does a difficult job, and does it well. Overall, this program is much faster, more compatible and capable..." > SINCLAIR QL WORLD Official Review, March 1993 issue, by M.Knight (bought many DP programs full price).

✓ "Many thanks for the update of PERFECTION SPECIAL EDITION. I am suitably impressed. Congratulations on producing the only word processor that I know that offers the best of all worlds as far as formatting is concerned. After Quill, PERFECTION is like a breath of fresh air." > Geoff Wicks, 1097HL Amsterdam, Netherlands (unsolicited letter dated 13 June 1993 all software including LIGHTNING PERFECTION SE, PRO PUBLISHER, CONQUEROR SE etc purchased at full price).

✓ "All I can say about QMATHS is: WOW!" > Robin Wyke-Holloway, Salisbury SP5 4WG (unsolicited letter received April 1993 - Mr Holloway is a full price purchaser).

✓ "Having used a range of desktop publishers on the Atari ST & Amiga, I admit I am very impressed with the superior performance of PROFESSIONAL PUBLISHER. It contains everything required" > SINCLAIR QL WORLD January 1989 issue, article entitled "6 of the Best" which also praised five other new Digital Precision programs.

✓ "May I take this opportunity to say that I have, in the past, found the software you have supplied me with (LIGHTNING etc.) to be of extremely high standard, on a par with that found in industry-standard PC packages. Keep up the good work. Without your quality software, I would be forced to abandon the QL and go to a PC." > G. Reynolds, Crosby, Liverpool L23 0SS (unsolicited letter dated April 2 1993, placing a further order for DP software: all programs old & new were purchased at full price).

✓ This twenty is but a casual selection, drawing only on extracts from letters received by DIGITAL PRECISION in the last few days and from articles (in respected, independent QL journals) that just happened to be to hand. If we really had to, we could locate about 1,100 equally complimentary recent communications (the figure has been carefully arrived at by sampling all our correspondence files): pleasant though such a trawl would be, we have more pressing things to do, like keep refining our programs! In case any scepticism still exists, we refer potential purchasers of our products to pages 18 and 19 of the September 1988 issue of Sinclair QL World, which contained three to four hundred other unsolicited quotations from happy Digital Precision customers (together with the customer's name and whereabouts), all of whom had bought their DP programs. That collection covered only three programs (and only partly - we ran out of space) and predated our best software (LIGHTNING SE, PERFECTION (+SE), PROFESSIONAL PUBLISHER, PC CONQUEROR (+SE) etc). We reproduce those pages below, duly reduced to fit (no magnifying lens supplied, nor eyesight lawsuits solicited). Don't think DP hides behind small print: send an SAE for a full-size copy, or ask for one free while ordering!



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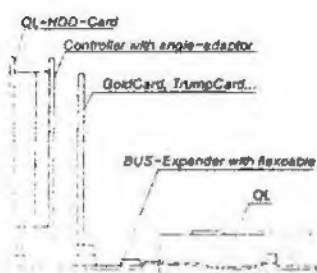
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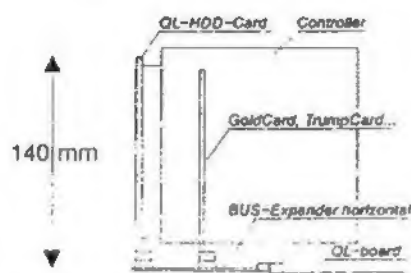
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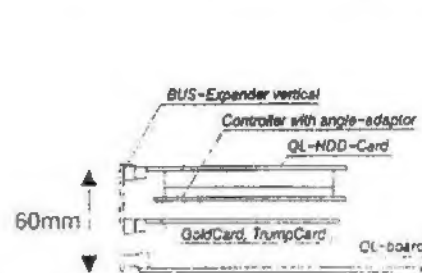
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International echomail & the whole King James' bible!

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## I<sup>2</sup>C Interfaces

The I<sup>2</sup>C bus was designed by Philips to simplify interfacing. Minerva MKII clock is driven by an I<sup>2</sup>C chip, & a connector allows connection of other circuits.

**Parallel Interface** Up to 4 can be connected powered by the QL. Each gives 16 input/output ports. Can be used wherever logic level signals are required  
eg model train controllers..... £26(£24) [£27]

**Analogue Interface** Up to 4 can be connected & powered off QL. Each gives 8 analogue to digital inputs, 2 digital/analogue outputs. For temp measurement, sound sampling etc....£31.50 (£29) [£30]

Data sheets.....£2.50 (£2) [£3]  
Control software manual.....£2.50 (£2) [£3]

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